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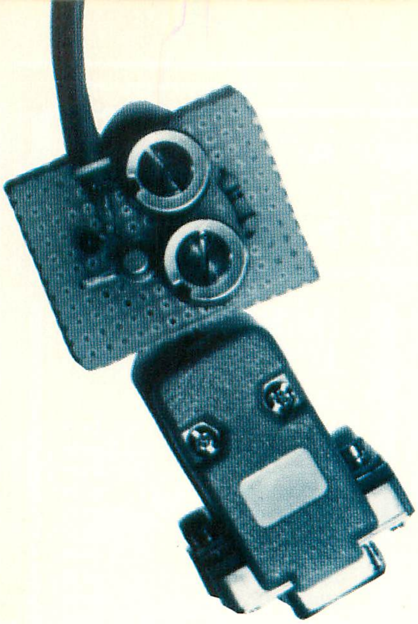
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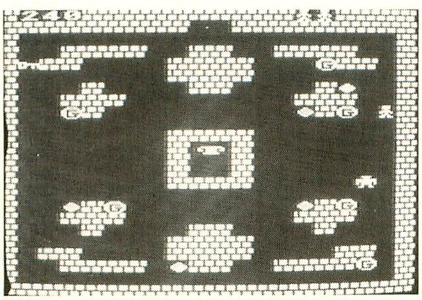
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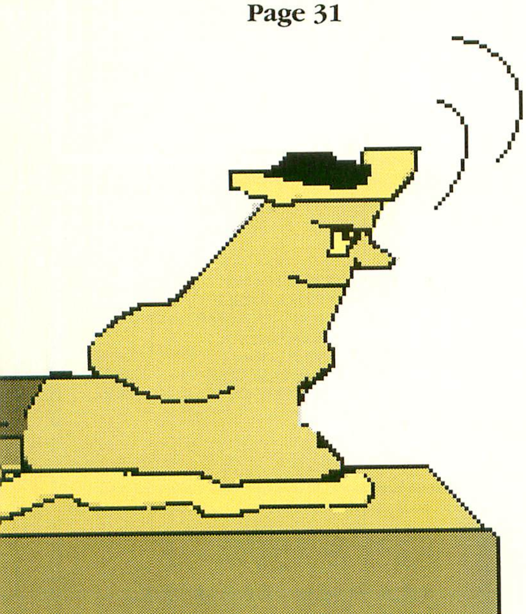
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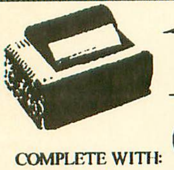
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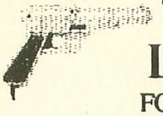
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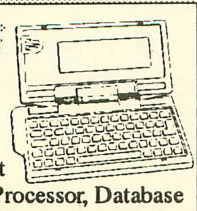
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The **Black Box** is a device for your XL or 130XE computer that adds tremendous power to your 8-bit Atari. It has two buttons, two switches, and a set of dip switches visible from the outside. It plugs directly into the back of the 600XL, 800XL, and 130XE computers. Custom cases may be an optional expense. The **Black Box** performs three main tasks: interface to a SASI/SCSI bus device (hard disks), Parallel printer port, and a RS232 port. A fourth option, available soon, will be a floppy disk port, especially useful to XF-551 owners. The SASI/SCSI port provides the necessary signals for hooking up most common hard disks. You may partition your hard disk into as many drives as you wish; up to 9 can be accessed at at time. By pressing one of the buttons on the **Black Box**, you will enter the configuration menu, where you can re-assign drive numbers, etc. When you exit, you will be right back in the program you were running when the switch was pressed. Each hard disk can be write-protected. The Parallel Printer port will allow you to hook up *any* printer that uses the standard Centronics interface. As an option, you can use the computer's extra memory as a printer buffer, or order the **Black Box** with 64K of on-board RAM. You may assign printer number and line-feed options within the menu (for use with multiple printers). Another amazing feature of the **Black Box** is the built-in screen dump. By pressing a button (on the box), the contents of your screen will be dumped to your printer (you can define text or graphics modes with a switch)! The RS232 port supplies the full RS232 spec signals for connection to a modem, or another machine (for null-modeming). The handler for the **Black Box**'s modem port is built in and takes up NO memory! The port handles rates up to TRUE 19.2K BAUD! A future upgrade for the **Black Box** is a floppy disk interface board. This will allow the addition of up to four 5.25" or 3.5" mixtures of floppy drives to be used with the system. The drives will act like standard single/enhanced/double density disk drives, but MUCH faster! All drives will be Super Archiver compatible, and support up to 2 sides of 80 tracks. Along with this hardware upgrade will come software capable of reading, writing, and formatting disks in IBM's MS-DOS format and the Atari ST format, and allow you to transfer files between those disk formats and the Atari's format. In addition , a machine language monitor has been added to allow memory disassembly, memory/register changes, and more. The Price of the **Black Box** is $199.95 for the basic unit and $249.95 with 64K of RAM (for printer spooler) plus $8 for S/H/I. An optional custom **BLACK BOX** case is available for $39.95 extra.

$\$199^{95}$ The "MULTIPLEXER"!© $\$199^{95}$

This device brings the power and flexibility of larger systems to your 8-bit. The **Multiplexer** is a device (actually a collection of modules) that allow up to 8 Ataris to read and write to the same drive (typically a hard disk), printer, and talk to each other. One "master" computer (any 8-bit) is equipped with the master **Multiplexer** interface. Then up to 8 "slave" computers can hook up to the master, each having their own slave interface. The "common" peripherals (things that are to be shared) are connected to the master computer. On each slave, all disk and printer I/O is routed through the master, so no drives are needed on them. The master computer can be configured in any manner you wish - you can for example have certain peripherals "local" to the slave, or routed to a different number on the master. Under development is a BBS system that will make full use of this device, allow ing up to 8 lines/users to be using the system at the same time! A mutiuser chat mode is a feature of this program, however, you do not NEED this program to run a BBS with the **Multiplexer** (but be warned that not all BBS programs will run concurrently). All slaves are independent, and do not need to have the same program running on them. This system is excellent for BBS SysOps, because you can be using your hard disk(s) while still running your BBS uninterrupted! Another example is in a classroom situation, or anywhere a disk needs to be shared by different people. This is an EXCELLENT programming/debugging tool as well! The **Multiplexer** price is $199.95 for a master and two slave units (plus $5 S/H/I). Additional slave units are $69.95 each.

$\$29^{95}$ "XF551 ENHANCER!"© $\$29^{95}$

The XF551 Atari drive is a fine product with one major flaw...It writes to side **TWO** of your floppy disks **BACKWARDS.** This causes read/write incompatibility problems with all other single sides drives made for Atari such as Indus, Trak, Rana, Percom, Astra, Atari 1050, Atari 810, etc. Add the **XF551 ENHANCER** to the new XF551 drive and your problems are over! This device will restore 100% compatibility while retaining original design qualities of Atari's super new drive. The **XF551 ENHANCER** is a **MUST** for all XF551 Owners. Installation is simple. Only $29.95 plus $4 S/H/I.

$\$99^{95}$ The "POWER PLUS"!© MEMORY UPGRADE $\$99^{95}$

(for 800XL'S and 130XE's only)

C.S.S. has made the "**Power Plus**"! memory upgrades available on an "unadvertised" basis to our regular patrons. These upgrades have become so popular we are now making them available to everyone! For those of you unfamiliar with "**Power Plus**"! upgrade, it is the most COMPATABLE upgrade available for the 800XL or 130 XE. All other upgrade kits have some degree of INCOMPATABILITY with certain software programs. C.S.S. studied this problem and developed the **POWER PLUS** upgrade which, to the best of our knowledge, appears to be 100% compatible. To upgrade a 130XE to 320K is only $99.95. To upgrade an 800XL to 320K is only $149.95 (circuitry from a 130XE is actually transplanted into the 800XL). Add $5 for S/H/I. C.S.S. will install these upgrades for only $20 if you wish.

NEW! OUR 24 HR. BBS! (716) 247-7157

For product information, **WEEKLY SPECIALS**, informative discussions on new products, theories, products you'd like to see developed, and used items for sale or trade. **CALL (716) 247-7157** 24 hrs. This **BBS** also features multi-user **"CHAT"** capabilities thanks to our new **'MULTIPLEXER"!** which allows multiple user and **BBS** boards to be linked so several callers can share boards or talk to each other simultaneously! **CALL (716) 247-7157** for **BBS** only. For **VOICE** orders or repairs, please call our normal Hot Line number **(716) 586-5545.**

BEST SELLERS

$\$69^{95}$ The "SUPER ARCHIVER"!© $\$69^{95}$

The new **SUPER ARCHIVER**, obsoletes all copying devices currently available for the **ATARI 1050**! It eliminates the need for Patches, **PDB** files, Computer Hardware, etc. Copies are exact duplicates of originals and will run on any drive; without exaggeration, the **SUPER ARCHIVER** is the most powerful **PROGRAMMING/COPYING** device available for the 1050! Installation consists of a plug-in chip and 6 simple solder connections. Software included. Features are:

- **TRUE DOUBLE DENSITY**
- **ULTRA-SPEED** read/write
- **FULLY AUTOMATIC COPYING**
- **SUPPORTS EXTRA MEMORY**
- **SCREEN DUMP** to printer
- **TOGGLE HEX/DEC DISPLAY**
- **SECTOR or TRACK TRACING**
- **AUTOMATIC DIAGNOSTICS**
- **DISPLAYS HIDDEN PROTECTION**
- **ADJUSTABLE/CUSTOM SKEWING**
- **AUTOMATIC SPEED COMPENSATION**
- **AUTOMATIC/PROGRAMMABLE**
- **PHANTOM SECTOR MAKER**
- **ARCHIVER/HAPPY ARCHIVER**
- **COMPATIBLE**
- **BUILT-IN EDITOR**-reads, writes, displays up to 35 sectors/track short
- **BUILT-IN CUSTOM FORMATTER** up to 40 sectors/track
- **BUILT-IN DISASSEMBLER**
- **BUILT-IN MAPPER**-up to 42 sectors/track
- **DISPLAYS/COPIES** Double Density **HEADERS**
- **AUTOMATIC FORMAT LENGTH CORRECTION**
- **SIMPLE INSTALLATION**

The SUPER ARCHIVER is so POWERFUL that only programs we know that can't becopied are the newer ELECTRONIC ARTS and SYNFILE/SYNCALC (34 FULLsectors/track). If you want it ALL...buy the "BIT-WRITER"! also... then you'll be able to copy even these programs! Only $69.95 plus $5 S/H/I.

JUST RELEASED

$\$99^{95}$ The "SUPER ARCHIVER II"!© $\$99^{95}$

(for ATARI 1050 drives)

NOW! COPIES all **ENHANCED DENSITY** programs plus retains all of the features of our World Famous **SUPER ARCHIVER!** (see above). Allows you to **COPY** or **CREATE** single or **ENHANCED** density protection schemes (including **PHANTOM SECTORS!**). Completely automatic; compatible with the **BIT-WRITER I**; the **ULTIMATE BACKUP/PROGRAMMING** device! Only $99.95 plus $4 S/H/I. **NOTICE!** If you already own a **SUPER ARCHIVER!**, you can upgrade to a **SUPER ARCHIVER II** for only $29.95 plus $5 S/H/I (disk only-no additional hardware required).

$\$69^{95}$ The "ULTRA SPEED PLUS"!© $\$69^{95}$

Imagine a universal XL/XE Operating System so easy to use that anyone can operate it instantly, yet so versatile and powerful that every Hacker, Programmer and Ramdisk owner will wonder how they ever got along without it! Ultra Speed Plus puts unbelievable speed and convenience at your fingertips. Use **ANY DOS** to place an **ULTRA SPEED** format on your disks, boot any drive (1-9) upon power-up, format your **RAMDISK** in Double Density, activate a built-in **400/800 OS** for software compatibility, plus dozens of other features too numerous to mention! Below are just a **FEW** features you'll find in the amazing OS:

- **ULTRA SPEED** SI0 for most modified drives
- **ULTRA SPEED** is toggleable
- Boot directly from **RAMDISK**
- Special timer circuits not required for 1 or 2 Meg upgrades
- Background colors adjustable
- Reverse use of **OPTION** key
- Cold-start without memory loss
- Built-in floppy/disk configuration editor (1-9)
- Built in **RAMDISK** configuration editor(1-9)
- **RAMDISK** exactly duplicates floppy drive so sector copying and sector editing are now possible
- Built-in MINI Sector Copier
- Toggle **SCREEN OFF** for up to 40% increase of processing speed
- Toggle internal **BASIC**
- Ram resident disk loader program (**MACH10** menu)
- **DOUBLE DENSITY RAMDISK** capable
- Entire **MEMORY** test that pinpoints defective **RAM** chip
- Boot any drive (1-9) upon power-up or cold-start
- Supports memory upgrades up to **TWO MEGABYTES**
- **THREE** Operating Systems in one (**XL/XE, 400/800, ULTRA SPEED PLUS**)

$\$39^{95}$ The "RICHMANS"!© $\$39^{95}$

80 Colum Word Processor

Easy to use, very **powerful**, and **NO ADDITIONAL HARDWARE** required! Works with TV or Monitor! This "**DISK ONLY**" 80 Column Word-Processor is simple to use while offering numerous features such as:

- Completely Menu driven
- Self contained DOS
- Complete Text formatting
- Built-in Printer Drivers
- Page numbering
- Justify and Endfill
- High speed Cursor
- Spell Checker
- 80 COLUMNS ON THE SCREEN!
- Insert and Delete
- Search Mode
- View only mode
- Memory Statistics
- Alternate Output
- Change screen Colors, borders, luminesce
- Mouse compatible
- XEP-80 Compatible

One expert has compared **40 domestic** and **foreign word-processors and concluded that the RICHMANS 80 Column Word-Processor is the best!** Only $39.95 plus $5 S/H/I. (64K required).

$\$79^{95}$ The "BIT-WRITER"!©

The Super Archiver "**BIT-WRITER**"! is capable of duplicating even the "uncopyable" EA and SYN series which employ 34 FULL sectors/track. The "**BIT-WRITER**"! is capable of reproducing these and **FUTURE** protection schemes of non-physically damaged disks. Simple installation... **PLUG-IN** circuit board and 4 simple solder connections. The "**SUPER ARCHIVER**" with the "**BIT-WRITER**"! is the ultimate **PROGRAMMING/COPYING** device for Atari 1050's. **EXACT DUPLICATES** of originals are made! Copies run an **ANY** drive. Must be used with Super Archiver. Only $79.95 plus $5 S/H/I.

$\$39^{95}$ The "QUINTOPUS"!© $\$39^{95}$

The "**QUINTOPUS**"! is an inexpensive device that provides a tremendous amount of convenience while eliminating the problems associated with the endless "daisy-chaining" of peripherals (eg: drives, interfaces, printers, modems, cassettes, etc.). The "**QUINTOPUS**"! is an I/O port expander that converts a single I/O output/input into five additional outputs/inputs. Instead of daisy-chaining all your peripherals (which often times results in passing a signal through 30 feet or more of cable!), the "**QUINTOPUS**"! allows each device to be connected directly to the computers through only three or four feet of cable. This is particularly useful when attempting to use **ULTRASPEED** or **WARPSPEED** data transfer rates. The "**QUINTOPUS**"! also provides the "extra" I/O ports often needed to connect devices not having daisy-chaining capabilities. Cable resistance and compacitance are greatly reduced thereby significantly improving the opportunity of accurate data transfers! Only $39.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

$\$59^{95}$ The "QUINTOPUS"!© $\$59^{95}$

(with SWITCHABLE PORTS!)

This Deluxe version of the "**QUINTOPUS!**" has all of the above features with the additional benefits of two **SWITCHABLE PORTS!** This means you can connect two computers to one printer or two printers to one computer; you can switch in a computer/printer combination and while you're printing out a long document, switch in a second computer to access a modem, disk drive, cassette deck, etc! Switch multiple combinations of peripherals or computers without the hassle or re-arranging I/O cables...simply flip a switch! Only $59.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

HARD DRIVE SPECIALS

COMPLETE Hard Drive Systems from C.S.S. include the **BLACK BOX**, power supply, logic board, controller, DOS, cables and assorted software! All systems are wired, preformatted and have sample programs on them. Simply take it out of the box, plug it in and **BOOT**....no hassles! We currently stock 5 MEG to 80 MEG systems ranging from $495 to $895. Sizes range from 3 1/2 inch, 5 1/4 inch, to 8 inch industrial quality. Call!

Controllers available separately from Xebec, Adaptec, Seagate, Konan, and Western Digital. Call for pricing.

SPECIAL-SPECIAL! 5 MEG REMOVABLE disk Hard Drive — BRAND NEW — only $495 complete! Hard Drive sold separately in limited quantities for only $99.95. Excellent for backing up larger HD systems! (Original drive cost was $1100!)

LIMITED SPECIALS

These specials are available on a first come first served basis. Pre-owned items are in exceptionally clean condition and are in perfect operating order. All items are warrantied. Sorry ... no rainchecks. Order 5 or more items and we'll pay the freight. These SPECIALS are for C.S.S. customers only - NO DEALER DISCOUNTS! Add $5 to order for S/H/I.

	NORMALLY	LIMITED SPECIAL
1. 130XE with 320K POWER PLUS upgrade and Ultra Speed Plus installed (with power supply and cable)		$ 250
2. 1050 DISK DRIVES with SUPER ARCHIVER II and SILENCER installed (with power supply and cable)		$ 250
3. SUPER PILL (without case)	$ 80	$ 22
4. ULTRA MENU/DOS	$ 30	$ 19
5. DISKCRACKER (Newest version)	$ 50	$ 19
6. ELECTRONIC PHANTOM SECTOR MAKER DELUXE	$ 60	$ 35
7. IMPOSSIBLE for 800 or 800XL	$ 150	$ 69
8. KLONE II (Generic HAPPY Backup)	$ 100	$ 75
9. SILENCER	$ 30	$ 19
10. BLACK PATCH (MASTER)	$ 50	$ 25

REPAIRS

For 24-48 hour repair service on Atari computers or drives, call our repair department at (716) 586-5545 day or night. All work is guaranteed, NO minimum estimate fees; if you have two or more items for repair and don't want to spend any money .... send them to us and we'll use the parts from both defective items to make one good working unit at NO CHARGE ... we'll keep the other defective item for parts!

BUDGETIZER BLUES

I have run into some problems with your *Budgetizer* program in the October/November 1989 issue of **Antic**. I had no trouble getting started, adding categories and making changes, but now I can't run the program with the new BUDGET.DAT file from my disk. I keep getting a Disk Error #5. What's wrong?

Curt Gienger
Warner, SD

This was a tricky bug to reproduce, but as far as we can tell, the problem comes from entering a CATEGORY without any FIELDS (or deleting all the fields from a category without also removing the category). Once the error #5 message comes up, you should reboot and run the program again. Check all your categories to make sure they all have at least one field. The money values in the field can all be zero, but there has to be a field name. Unfortunately, if you can't get your data file to load from disk at all you may have to delete the file from your disk and start over from scratch. — ANTIC ED

CRIBBAGE HELP!

(*The October, 1989 I/O Board plea for help with* Cribbage Atari, *from* ***Antic*** *May 1989, did not go unanswered. Two readers sent in fixes right away.* — ANTIC ED)

The problem with running the May Cribbage game on an 800 can be found in one of the statements in line 830. The statement is "XX=XX^1" (raise XX to the first power) which shouldn't change the value of XX at all. Unfortunately, on the 800 the value of XX^1 is actually a little bit smaller than the original XX. When XX is used later in the program as an indicator of which card was chosen, the value is effectively off by one, and the game gets noticeably confused.

The statement was intended as a delay, which the 800 doesn't really need anyway. I simply removed the delay, by removing the XX=XX^1 and the following colon. The program now seems to function correctly — in fact, I've been pleasantly surprised by the "skill" of the computer's game!

Del Motteler
Des Moines, WA

I've experienced other "strange" occurences like this with the Atari BASIC version A that came with my 800. (Some of these are documented bugs, some are not.) These incompatibilities were cured when I got a disk copy of BASIC C to use with my 800. The main drawback is having to boot BASIC from disk. I recommend that 800 users get a copy of BASIC version C — it will solve a lot of your problems.

Darryl Howerton
Jonesboro, AR

YEMACYB, WHERE ARE YOU?

I was delighted when I discovered from your magazine that software did exist to take advantage of the color graphics capabilities of my Star NX-1000 Rainbow printer. I wrote — but to an old address, so my order took months to arrive. Anyone wanting to order YEMACYB/4 should send $29.95, plus $2 shipping and handling, to Electronical Software, P.O. Box 1106, Taylor, MI 48180.

After receiving the program, I had to write again, to find out why the program wouldn't work properly. Michael Clayton called quickly with the answer. Apparently, the YEMACYB programs and certain models of the Xetec Graphix AT interfaces are incompatible. (The Xetec staff spoke of extreme sensitivity to serial timing, whatever that means.) Once I tried a different interface, I had no trouble getting beautiful printouts.

Dixie Barber
Russellville, MO

1050 DIFFICULTIES

I have three 800XL computers and

seven 1050 disk drives. Beginning two years ago, I started having difficulty reading protected disks — now I can't read some unprotected commercial disks, though I can still read disks that I have created. I suspect a speed or alignment problem with the drives. Since I have a background in electronics, I feel capable of whatever adjustments or replacements may be required. Are there any repair manuals, or diagnostic disks, I could try?

Richard Mueller
Brick, NJ

We recently had a similar problem ourselves, when two 1050 drives could no longer read each others' disks. Our local 8-bit hardware expert, Charles Cherry, was able to get the drives back in tune with a bit of cleaning and by reseating all the chips — prying them up and pressing them down again. For more complex repairs, you should be able to get a repair manual from a mail order source such as American Techna-Vision — check their ads in recent issues of ***Antic***. — ANTIC ED

MORE 1050 WOES

I have a 1050 disk drive that broke its drive belt not too long ago. I have since returned it to partial service, using a very thick rubber band, but it now spins slower than its proper 288 rpm. It may have already zapped a particular copy-protected disk by writing to it improperly. Can you or your readers refer me to a manufacturer or service from which I can order the proper belt?

Edwin Stovall
St. Louis, MO

As far as we know, the belts are no longer available — and a proper belt is indispensible. Many repair services are cannibalizing old 1050s for parts. One of our frequent advertisers, Computer Software Services, offers a repair service — call (716) 586-5545 for information. Note that if you have two identical items for repair, they will fix one free, if they can keep the other for parts! If anyone knows of a source for belts — from other kinds of drives, for instance — we'd be delighted to hear about it. — ANTIC ED

TYPO TRIALS

I have ordered your monthly disks, and am generally delighted, but I have one problem. I do not know how to use the TYPO II Automatic Proofreader. A couple of my disks have TYPOII.LST on them, but I don't know how to use them from BASIC. How can I SAVE a copy of that listing?

Brandon Palmero
San Bernardino, CA

You don't need TYPO II to run any of the programs on disk. The version on some Antic Disks is a listed BASIC program, included for your convenience in typing listings from other issues. You can't run listed programs (with .LST endings) from the Antic Disk Menu, but from BASIC you can ENTER "D:TYPOII.LST" to get the program from the Antic Monthly disk, then SAVE it to a new disk as TYPOII.BAS. Then you can RUN it from disk to help you type in a new program. — ANTIC ED

XF551 LOOSE CONNECTIONS

I doubt anyone would argue with calling the double-sided, double-density XF551 disk drive a great peripheral for the Atari. However, the circuit board lacks ruggedness. I first realized that there was a problem when I took my drive to a users group meeting — one of the serial I/O ports no longer worked. After taking the drive to a local computer fair, the drive wouldn't work at all. I ended up having to resolder the power connector's circuit board contacts and solder four jumper wires into the drive to replace the circuit board traces between the I/O sockets and the associated circuitry on the board.

My advice to XF551 owners is, once you plug your I/O cables and power transformer in, try to leave them plugged in whenever you have to move your drive. If you pull out and replace those connectors more than two or three times you could wind up with a dead drive. Fixing the problem is easy and inexpensive for anyone who knows much about electronics.

Charles Cole
Sierra Vista, AZ

In January 1989 I acquired an Atari XF551 disk drive. After one month one port died, and in September the other one went South. On close inspections, I realized that the rivets had loosened, lifting the pads from the boards. The solution is to replace them with 4-40 bolts.

Piers Cunliffe
St. Catharines, Ontario, Canada

Two users with similar problems and different solutions. As always, we must caution that opening your drive will void any warranty left, and ***Antic*** *takes no responsibility for the results of any modifications such as suggested above.*— ANTIC ED

LOADS OF PROBLEMS

I have some back issues of the magazine from before you started using the BASIC loader for the special graphics characters. The current loader says that it can be used with other programs. I know to start with lines 10-250, but how do you create the DATA lines to use with the loader?

Peggy Darlington
Walls, MS

When we say you can use the loader with other programs, we're talking

about other programs printed with loaders. Since the loader part is always the same, this saves retyping all but the DATA lines. To get the numbers for the DATA lines, we run the "hard-to-type" lines through another program. To get the numbers and enter them manually would require figuring out the correct numeric value for each character, then entering that number. You might as well struggle through typing in the characters. Or buy the disk . Disks are available all the way back to Antic issue #4, when we first started selling disk versions. See our Back Issue ads in recent issues.— ANTIC ED

MONDAY ON SUNDAY

Your *Best of Antic* disk has a terrific program by Alfred Filskov called *Appointment Calendar*, originally published in the January 1985 issue of **Antic**. The only thing is that I would like to have each calendar week begin with Sunday, not Monday as at present. Is there any to revise the program?

Richard Dawid
Monroe, CT

Chris Wareham of Spearfish, SD sent us an easy fix that ran back in the March 1986 issue of ***Antic****. Just change lines 180 and 1590-1660 as shown below.* — ANTIC ED

```
180 DATA SUNDAY,MONDAY,
TUESDAY,WEDNESDAY,THURS
DAY,FRIDAY,SATURDAY
1590 DATA 366247251361,
477351362472
1600 DATA 511462473513,
623614625735
1610 DATA 144725736146,
255136147257
1620 DATA 366247251361,
471462473513
1630 DATA 622573514624,
733614625735
1640 DATA 144725736146,
256247251361
1650 DATA 477351362472,
511462473513
1660 DATA 622573514624
```

AMP INSTRUCTIONS

I'm new to the Atari world and I find I need some help with the August 1989 Antic Monthly disk. I can load and play music with the Antic Music Processor (AMP) disk bonus but I can't figure out how to use the editor to program my own music. I didn't see anything on the disk or in the magazine that explained how to do that. Did I miss something?

Jack Bryant
Myrtle Beach, SC

Sorry for the confusion — the June 1989 issue and disk had the instructions you need. AMP 2.1 on the August disk was simply a slightly modified version of June's AMP 2.0 (it fixed a minor bug) so we didn't include the instructions again. The June, 1989 issue had AMP 2.0, instructions in the magazine for using the new Lyric Editor, and a recap of the Note Editor instructions in a HELP file on the Antic Monthly Disk. Also on disk were several of the winners from our song contest.

We originally ran AMP version 1.2 as a Disk Bonus in the December 1988 issue of Antic, with detailed instructions in the magazine on using the somewhat cryptic "Backus-Naur" notation. The disk with that issue included a program that will convert songs in the popular AMS II format to AMP format — a must for bulletin board frequenters. All these back issues and disks can still be ordered — see our ads for Back Issues in recent issues of ***Antic*** *.— ANTIC ED*

RAMBRANT AND AMP TIPS

For anyone interested in a new usage for RAMbrant, I have found that MODULE 1 (DOS utils) loads in Computereyes picture files. After loading in a closeup of a person's face, you can use the WINDOW option while in the MIRROR drawing mode and get the mirror images of both halves of a person's face. The results are surprising and quite impressive in the 16-shade mode, which can be printed out using MODULE 2, the GTIA 16-shade printer dump.

I've also found that the Antic Music Processor (AMP) works with DOS XE and an XF551 drive. You can fit a lot of songs on a double-sided disk, and the songs can be categorized in subdirectories such as ROCK, CLASSIC, TV SHOWS, etc.

Gregory Vilicic
Clifton, NJ

GERMAN GOODIES

From Germany, the folks at KE-Soft have written to let us know of several software products they sell. Translating as best we could from their German-language fliers, they offer **DRAG**, a Boulderdash clone starring the frog Drag; the space shoot-'em-up **OBLITROID**; the puzzle-game **SOGON**; **ZADOR**, a Mah-Jong clone; the disk magazine **ZONG**; and a double-game disk with **TOBOT**, a Robotron-style game, and the graphic adventure **BROS**. If you can read and write German, and are looking for new software, you can write for more information at KE-Soft, Frankenstrasse 24, 6457 Maintal 4, West Germany. — ANTIC ED

Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.

Send letters to: Antic I/O Board, 544 Second Street, San Francisco, CA 94107.

SIO-2-PC

(hardware interface)
N.R. Kennedy
300 S. Vancouver
Russellville, AR 72801
(501) 967-3843
IBM-PC compatible with RS-232 port required
$39.95

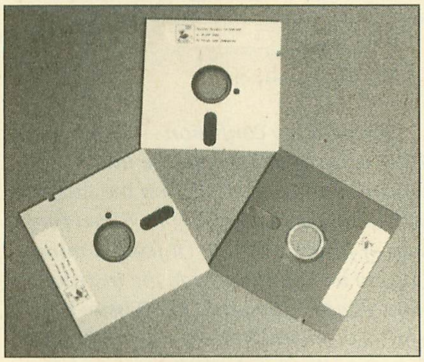
Tired of making do with that IBM-PC compatible you bought? Now you can turn it into a RAMdisk and drive emulator for your trusty Atari 8-bit, with **SIO-2-PC**. Complete with 9-pin RS-232 connector and all the cables you need, SIO-2-PC lets you hook up your PC to your 8-bit and then create up to four RAMdisks in the PC's RAM space. You can then use these RAMdisks from your 8-bit, using your favorite Atari DOS, just like using another drive. Once you have your files on RAMdisk, you can save them to the PC's high capacity hard or floppy drives. If you transfer your startup files to the PC, you can even boot from it without needing a real disk drive.

SIO-2-PC will daisy chain with your other peripherals without interference. For special setups, custom cable lengths are available, and a 24-pin RS-232 connector costs $2 extra. If you already have that #@*&! PC or clone, and appreciate the irony of turning it into a file server for your Atari, SIO-2-PC will do the trick at a price that's hard to beat.

PS PRINTER DRIVERS, RAMDRIVE + XL TO XE

(hardware/utilities)
Innovative Concepts
31172 Shawn Drive
Warren, MI 48093
(313) 293-0730

If Broderbund's popular Print Shop software doesn't have a driver for your printer, Innovative Concepts may be able to help. Their new drivers are designed to work with Print Shop and Print Shop Companion, without modifying the original disks. **PS Atari 1020 Driver** lets you use Print Shop with the Atari 1020 Printer/plotter, using any one of four colors. The **PS Okimate 10 Driver** lets Okimate 10 users print their PS graphics — in black, only. Also limited to black, the **PS Epson LQ-500/800 Driver** works with the newer Epson and compatible 24-pin printers. All three drivers retail for a low, low $14.95 each!


Photo by Wendy Johnson

Expanding their collection of memory upgrades, Innovative Concepts introduces **RAMdrive + XL to XE** ($59.95), a low-cost memory upgrade for the 800XL that makes it 100% compatible with the 130XE, including ANTIC modes! The upgrade comes complete with RAM chips, instructions, and utilities disk. Installation by someone experienced at soldering is recommended.

DRAPER PASCAL 2.1

(programming language)
Draper Software
307 Forest Grove Drive
Richardson, TX 75080
$20 complete, $15 manual/registration fee only

Pascal has become the learning language of choice at many colleges. Draper Software brings this modular, high-level language to the 8-bit Atari with **Draper Pascal**. Released as shareware, the latest version of Draper Pascal is available on CompuServe, GEnie and Delphi with a 39-page "starter" manual. The complete 86-page manual is available by mail for a registration fee of $15. This complete manual includes extensive explanations of reserved words, plenty of examples, BASIC equivalents, details on RAMdisk usage, and much more.

MONEY UN-LIMITED

(applications software)
KCTronics
457 June Street
Fall River, MA 02720
$9.95 complete, $8 manual/registration fee only

Tired of trying to keep a budget with little amateurish programs? Try **Money Un-LimiTeD** from KCTronics. This inexpensive shareware program keeps track of your checking and savings accounts, and bills and income. Special monthly worksheets let you juggle your money more easily than ever as you try to stay within your budget. Instead of cluttering your desk with little scraps of paper, you can even use the special NotePad to record your notes. Users are free to copy and share the program. New users are requested to send in an $8 registration fee, for which they will receive the manual and information on any updates.

Money Un-LimiTeD is only the first of several useful products planned by KCTronics for home and small-business use. In the works are a general-purpose text processor and modem terminal, a menu-driven database, a physics/calculus/chemistry homework tutor, a phone dialer-database and a joystick-controlled, 2.5D animated CAD program. A

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Antic Sampling Processor

By Steven Lashower

New breakthrough from the author of Antic Music processor

Build yourself a sampling processor for under $15 — and create sound samples for use in your own BASIC programs. This slick, machine-language software can be used on 8-bit Atari computers with at least 48K memory.

This issue's Super Disk Bonus is the Antic Sampling Processor, a high-powered audio digitizer written in fast machine language by Steven Lashower, who programmed the very popular Antic Music Processor which appeared in the December 1989 and July 1990 issues of Antic. Antic Sampling Processor requires a bit of hardware construction, with some basic knowledge of electronics and soldering, but the results are well worth the effort. To hear just how good these results are, you can play the music samples included on this month's Antic Disk. No special digitizer hardware is ever required for playing back the sounds recorded into your 8-bit Atari by the Antic Sampling Processor.

Lashower also provided a very well-documented player utility written in BASIC, for use with your own programs. We are looking forward to your Disk Bonus submissions which employ digitized speech and sound effects, created with The Antic Sampling Processor. — ANTIC ED

DIGITIZING AND MIDI

The Antic Sampling Processor (ASP) is a sophisticated combination of Atari 8-bit software and hardware audio digitizing technology. Written in MAC/65 assembly language, ASP captures pure digital sound (through a process called **sampling** or **digitizing**) from any stereo or amplifier source.

In the July 1983 issue of **Antic**, an article called *Talk Is Cheap* by Ed Stewart gave specifications for an 8-bit Atari digitizing circuit on which the ASP hardware is loosely based. The new circuit was designed by John Shook and Jim Burgess of the Disneyland Sound Department. The software is written in MAC/65 with core digitizing routines for recording and playback based on the old 1983 routines.

Once the sound, or sample, is stored in the computer's memory, you can play it back at any speed — forward or backward. Some commercial recordings have various sounds and vocals recorded in reverse. Since Antic Sampling Processor has a **back-masking** feature that allows you to play your samples backwards, you will be able to hear those special parts of the Beatles' notorious "Revolution #9" without ruining your phonograph.

No sampler is complete without MIDI support — Antic Sampling Processor is compatible with Hybrid Arts' MIDI interface and any MIDI-capable synthesizer. With a synthesizer, you can actually "play" the sound samples, thus turning your Atari into a low-cost, high quality, digital sampling work-station. For the programmer, Antic Sampling Processor comes with some easy-to-use rou-

tines written in Atari BASIC that load and play Antic Sampling Processor samples.

RUNNING ASP

To record your own samples, you will need to build the digitizer as shown below. However, you can run Antic Sampling Processor and play pre-recorded files without a digitizer.

Use DOS command [C] to copy ASP.COM to another disk that contains the DOS.SYS file (DOS 2 or 2.5). Then use command [E] to rename "ASP.EXE" to "AUTORUN.SYS". Turn your computer off, remove all cartridges, and turn your computer on again (XL/XE users hold down [OPTION]). Antic Sampling Processor will load and run automatically.

SAMPLE TEST RUN

With the ASP Main Menu onscreen, insert your copy of this issue's Antic Disk in drive 1 with Side B up. Press [L] to load a file, and at the prompt type D:SLOOPJB.ASP [RETURN]. Once the file loads, press [P] to play.

To see the color display during playback, press [C], then play the sample again. Press [B] to play it backwards. Press [O] to change the playback rate — enter 20 and then press [RETURN] to play the sample faster.

HOW IT WORKS

Every sampler needs a hardware A/D (Analog to Digital) converter that enables it to translate speech (analog information) to data that the computer can understand (digital information). We are indeed in luck because the Atari joystick ports are actually A/D converters. The Atari paddle controllers are analog input devices.

As the controller (or paddle) is turned, the converter generates a count in response to circuit resistance — the time it takes for a capacitor inside the computer to charge up. Turning the knob to the right lowers the resistance, so the capacitor charges up quickly. Turning the knob to the left increases the resistance and the charging time. If these resistance changes are recorded fast enough, and if they have a direct relationship to the sound waves produced by speech, then we can read these numeric values from a paddle port and store them in the computer as speech patterns.

A simple hardware circuit is required to convert the voltage produced by any audio source into a variable resistance that the computer reads. These values are read at very high speeds (approaching 5,000 times per second, the **sampling rate**) and stored in memory. Then they are sent to the video speaker to produce a voltage which is in direct proportion to paddle resistance. The result is a *pretty good* reproduction of whatever sounds were played through the circuit. Admittedly, the higher the sample rate the less distortion during playback. But saved samples are notorious RAM hogs.

BUILDING THE CIRCUIT

The ASP circuit can be built for about $9 and all parts are available at almost any electronics store, including Radio Shack. One of each of the following items is required to build the circuit shown in *Figure 1*.

Note that Radio Shack 9-pin female connectors will not work directly with the Atari 130XE and XEGS computers because the shield surrounding the connector is too large. You can solve this problem with a joystick extension cable, available from Radio Shack or from just about any toy store or department store that sells video game accessories for the Atari and Sega game systems. Plug the female end of the joystick cable into the XE computer, and the male end into the connector for this digitizing circuit. The "ears" on the Radio Shack connector do not interfere with this setup.

The small AC current sent to the digit circuit from your audio source causes the base current to change through the transistor. This in turn varies the effective resistance presented to the paddle port. The computer believes that a paddle controller is connected and is being turned back and forth at a very high rate. The 1M pot is used as the circuit's gain

Item Description	Radio Shack Part #	Price
9-pin female connector	276-1428	$1.19
Hood for 9-pin connector	276-1539	$1.19
Phono Plug to Stripped Wire	42-2370	$1.69
1.0 uF capacitor	272-1434	$ .59
NPN transistor (NTE 123AP)	276-2058	$ .49
1M Ohm potentiometer	271-229	$ .69
100K Ohm potentiometer	271-220	$ .69
100K Ohm fixed resistor	271-045	$ .19
IC-Spacing Perfboard	276-1365	$1.79

FIGURE 1

control to get rid of most unwanted noise during program execution. The 100K pot is used to control input volume into the circuit.

A patch cable can be used to connect the RCA phono plug to any receiver/amplifier. I have found that the best sampling results can be obtained by recording from a small, portable cassette deck with a MINI (1/8 inch) earphone output. To do this, you will need a PHONO to MINI converter plug (Radio Shack #274-330 - $1.69.) Make sure that the volume level on the cassette is turned almost all the way down, assuring as little distortion as possible.

USING ASP

Start the Antic Sampling Processor program as outlined above. To sample any new sounds of your own you must plug the digitizer circuit into the **second** joystick port. Select from ASP's nine functions on the Main Menu by typing the highlighted letter that appears just to the left of the function name.

[P] Playback Sample. Use [P] to play a sample stored in memory.

[R] Record Sample. Use [R] to record a new sample, storing it in memory.

[T] Test Microphone. With this option, ASP digitizes audio for an unlimited period of time, echoing the data it receives through the computer speakers so you can adjust volume and noise control potentiometers. The sample is not stored in memory. Press [RESET] to return to ASP's main menu.

[L] Load Sample. This command loads in a digital sample file from the disk drive specified (Dn:filename.ext). Drive 1 will be used if no drive number is specified. (You may use a RAMdisk of 40K or larger.) The sample is loaded into the same area of memory from which it was saved. Please see [O] Set Options for more information on memory management.

[S] Save Sample. Save a digital sample in memory to a disk. Type [S], then enter a filename. If you do not specify a drive, the file will be saved to drive 1. Please note that sample files can get quite large (over 32K, or 250 sectors). Disks fill up quite fast.

[C] Color Display. Use [C] to toggle the Color Display option ON or OFF. When the color option is enabled, a graphic display flashes different colors on the screen in response to the audio data. This visual effect only works during playback.

[B] Back-Masking. Plays your sample backwards. Use [B] to toggle the Back-Masking option ON or OFF.

Using Back-Masking, you can really experience some weird and unusual sounds. Some major rock-and-roll groups use back-masking to record special audio effects. For example, try sampling the Beatles' "Revolution #9" from their *White Album* or the Electric Light Orchestra's "Fire on High" from their album, *Face the Music.* The voices that seemed to be speaking gibberish will speak in pure and clear English once played back with ASP's Back-Masking feature.

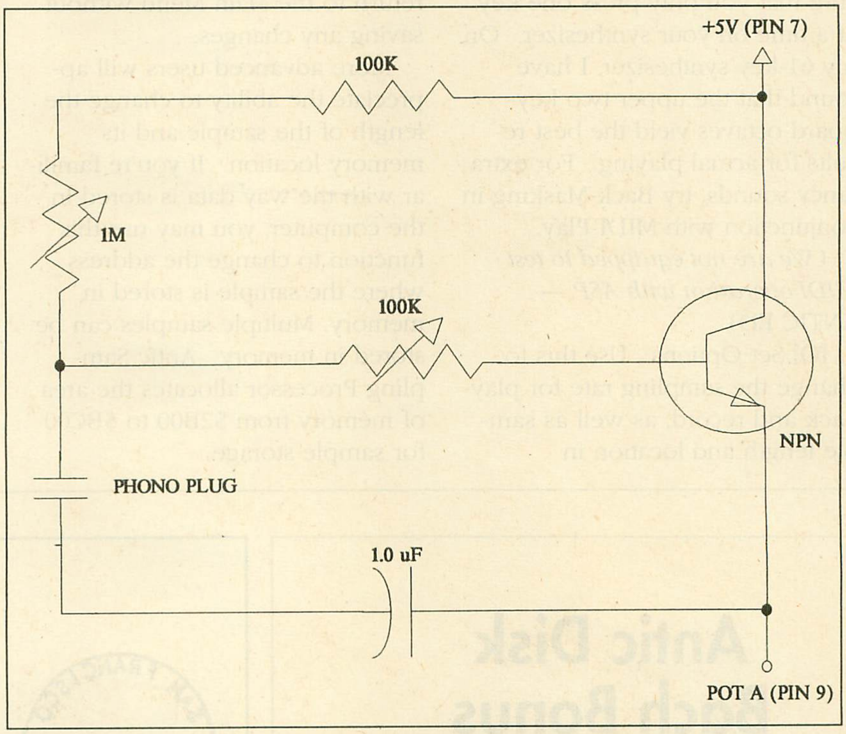


FIGURE 2: Schematic Diagram for Digitizing Circuit

[M] MIDI Playback. Plays the sample through an attached MIDI device. Use [M] to toggle the MIDI Playback option ON or OFF.

MIDI Playback requires a MIDI compatible synthesizer (the Casio CZ series instruments are great, low-cost, full featured MIDI synthesizers) and a Hybrid Arts (or compatible) MIDI interface. A MIDI cable connected from MIDI-OUT on the synthesizer to MIDI-IN connector on the Hybrid Arts

box is also necessary. ASP requires that the synthesizer transmit data through MIDI Channel 1.

Once MIDI Playback is ON and a sample is in memory, type [P] for playback, and then play some notes on your synthesizer's keyboard. Since Antic Sampling Processor acts as a *monophonic* sampler (a synthesizer that can play only one note at a time), make sure that you only press one key at a time on your synthesizer. On my 61-key synthesizer, I have found that the upper two keyboard octaves yield the best results for actual playing. For extra fancy sounds, try Back-Masking in conjunction with MIDI-Play.

(*We are not equipped to test MIDI operation with ASP.* — ANTIC ED)

[O] Set Options. Use this to change the sampling rate for playback and record, as well as sample length and location in memory. A flashing cursor appears on the second status line located in the upper half of the screen. Change the sampling rate for playback [P] and recording [R] by using the [LEFT & RIGHT ARROW KEYS]. Note that ASP uses hexadecimal values for these settings. Press [RETURN] to save the new values in memory and return to the Main Menu. Press [ESC] to return to the Main Menu without saving any changes.

More advanced users will appreciate the ability to change the length of the sample and its memory location. If you're familiar with the way data is stored in the computer, you may use this function to change the address where the sample is stored in memory. Multiple samples can be stored in memory. Antic Sampling Processor allocates the area of memory from $2B00 to $BC00 for sample storage.

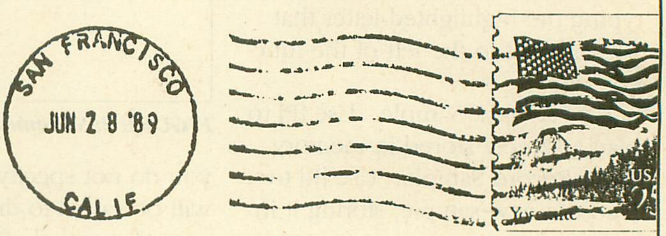
BASIC ROUTINE

How would you like to use some of the samples in your own BASIC programs? Well, it's no problem because Antic Sampling Processor comes with some easy-to-use routines that you can implement in your own programs. Extensive REMarks make PLAYER.BAS easy to follow. You could use it to try to make a Battleship-type game where the computer actually calls out coordinates, hits, and misses, for example. The possibilities are endless.

Steven Lashower studies Computer Science at California State University, Fullerton, and works at Disneyland. His Antic Music Processor *appeared in the December 1988 issue of* ***Antic****, and the new, improved* AMP, Version 2.0 *with lyric editor ran in June 1989.*

Antic Disk Bach Bonus

This month's Antic Disk also features three song files for the popular June 1989 disk bonus *Antic Music Processor* – BRANDEN4.AMP, BRANDEN5.AMP and PRE11JSB.AMP. These three files present a choice selection of works composed by Johann Sebastian Bach. Brandenburg Concertos number 4 and 5 were sent us by Rashad Chichakly of Mission Viejo, California. The Bach Prelude Number 11 was entered in our songwriting contest by runner-up Lee Vaughan of San Jose, California. (Lee's "Bach Prelude #20" appeared on the June 1989 Antic Disk).



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Photo LabelMaker

By Gary Coppola

Print tiny labels just right for your 35mm slides — or anywhere you need lots of information in a little space

Photo LabelMaker is just the ticket for keeping tabs on your fast-growing 35mm slide collection — or for printing tiny return address labels and many other uses. This BASIC program works on Atari 8-bit computers with at least 48K memory and disk drive. The program is designed for Epson-compatible printers with codes for producing compressed pitch, superscript font, and 6/72-inch line spacing. Other types of printers may also be able to use Photo LabelMaker if you can insert the proper code sequences from your printer manual, as explained in the article.

Photographers, whether amateur or professional, tend to rapidly accumulate an overwhelming amount of pictures. Keeping track of these pictures usually requires some sort of filing system, either manual or computerized. Professionals who routinely send photos to clients need to be able to quickly locate a particular image. However, the serious photographer who enters club competitions, or even the casual photographer who just wants to identify vacation shots quickly, can find a good filing system invaluable.

No matter what type of filing system you use, it is important to put a substantial amount of information, clearly written, on each image. These facts may include a title, location, subject description, exposure values, photographer's name and address, filing data, etc. For those who prefer to shoot 35mm slides, there just isn't enough room on the mount to write much of anything.

Out of necessity I wrote Photo LabelMaker. This program lets you rapidly make mini-labels for your slides — or anything else where space is scarce, for that matter. These labels of either three or four lines, with up to 28 characters per line, provide plenty of room for lots of information, especially if you use two labels per slide.

GETTING STARTED

Type in Listing 1, check it with TYPO II and SAVE it under the name PHOTOLBL.BAS. If you have difficulty typing the special characters in line 10030, don't type them in. Instead, type in Listing 2, check it with TYPO II and SAVE a copy. When you RUN Listing 2, it creates this line and stores it in a file called

LINES.LST.

To merge the two programs, LOAD "D:PHOTOLBL.BAS" and then ENTER "D:LINES.LST". Remember to SAVE the completed program before you RUN it.

Make a copy of PHOTOLBL.BAS on a separate disk, and set one copy aside as a master copy. If you have the Antic Monthly Disk, make a "working copy" of the program on a separate disk before you try to use it. Your working copy should be on a disk that is *not* write-protected. At certain points in operation, the program may rewrite several of its lines and SAVE the modified program back to disk. Such self-modifying programs are more vulnerable to damage than most others, so it's very important to keep a master copy as a backup.

When RUN, Photo LabelMaker displays a title page which prompts you to press [START] to begin. Then, after a short pause, the main menu appears, with four different label options — SINGLE LABEL, DOUBLE LABEL, 4-LINE LABEL, and LABEL SETUP.

LABEL TERMINOLOGY

Choosing SINGLE LABEL will allow you to make one label at a time. In DOUBLE LABEL mode you can make two separate labels. This is useful if you need an upper and lower label on a slide (see *Figure 1*). Both of these options will produce labels with three lines of text. The 4-LINE LABEL mode will provide you with four lines of text. However, the 4-line label is only available as a single label.

For any of these labels there is a choice of three label types — BLANK, FIXED, or FORM. A BLANK label allows you to enter any text you wish on it. A FIXED label contains information that is used repeatedly, such as your name and address, company name, etc. Picking this option automatically enters the information on the label with just one keystroke, ready for printing.

A FORM label is a mini-form of your own design that, when chosen, is displayed on the screen. All you have to do is fill in the appropriate data for each subject. An example of such a label before and after completion is shown in *Figure 2* (4th and 5th labels). It is available in both 3-line and 4-line format.

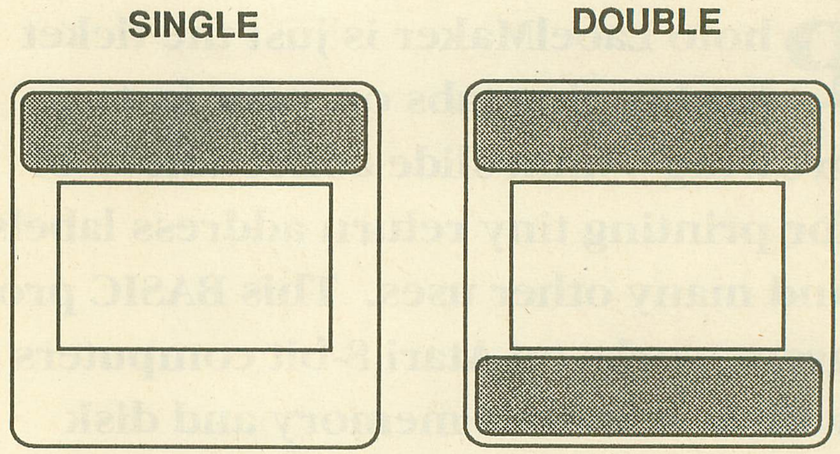


Figure 1

Before you can use the fixed or form labels you must create them. This is done in the LABEL SETUP mode in the main menu.

ENTERING YOUR TEXT

Before you enter the LABEL SETUP mode, you should familiarize yourself with the text-entering screen. Select the SINGLE LABEL option. A figure of a slide will appear on the screen, then an outline of the label will be drawn above it.

An OPTIONS menu will then be displayed. Choose LABEL INPUT and, when the LABEL TYPE submenu appears, select BLANK. If you select FIXED or FORM at this point, a message will appear within the label outline that these have not been created yet.

You will notice that to the left of the label outline you are prompted to type in the first line of text. For now, just press [RETURN] three times. The default prompts used in the program are Line #1, Line #2, etc. If these are not to your liking you can customize them to fit your needs.

LABEL SETUP

Return to the main menu, then select LABEL SETUP. A menu will appear with six options. The first option, SUMMARY, displays the current prompts, fixed labels, and form labels that are in memory.

To create your own prompts, select CUSTOM PROMPTS from the setup menu. Next, choose which type of label your new prompts will be associated with. Finally, type the prompt (9-character maximum) in the box, press [RETURN] and then enter the remainder of the prompts. When finished, either select another label type or return to the setup menu.

To create a fixed label with information you will want to print re-

peatedly, choose FIXED LABEL from the setup menu. Select either a 3-line or 4-line label, then type the text within the outlined area. Press [RETURN] after each line is entered.

Form labels are just as easy to create. Select CUSTOM FORM from the setup menu, choose a 3-line or 4-line label and then type your categories. You can have as many categories on each line as will fit within the label outline. Press [RETURN] after each line is entered.

After you enter your fixed or form label, the program returns you to the setup menu. The screen will go blank for a few seconds while the new lines of the program are being rewritten. Now if you choose SUMMARY, all of your customized prompts and labels will be displayed. If these modifications are only going to be used temporarily, return to the main menu and continue on. However, if you want to make these changes a permanent part of the program select SAVE TO DISK before returning to the main menu. Remember, make sure there is no write-protect tab on the disk.

MAKING LABELS

With the setup completed, making a label is a snap! From the main menu, choose a label, then from the options menu select LABEL INPUT (UPPER or LOWER LABEL if you are in DOUBLE LABEL mode). Decide whether you want a blank, fixed, or form label.

If you choose form label, the form's text appears in the label area. Move the cursor to the desired location along each line with the [CONTROL] [ARROW] keys and then fill in the appropriate information. Press [RETURN] after each line is completed. Once you finish your label, you're ready to print.

PRINTING LABELS

Make sure your printer is hooked up, and on. Carefully position

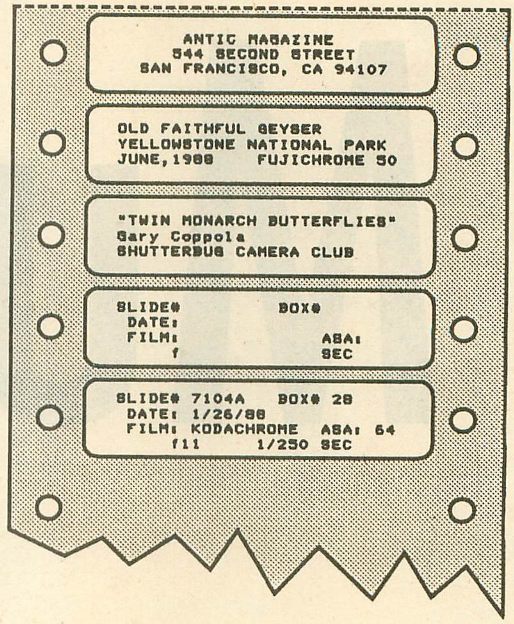


Figure 2

the pin-feed label in the printer. Then select PRINT LABEL from the options menu. Enter the number of labels you want to print and press [RETURN]. Out comes your label!

The printer control codes in line 7160 are for Epson or Epson-compatible printers. If you have a different printer, you must change them accordingly. Consult your printer manual for codes controlling compressed pitch, superscript font, and 6/72 inch line spacing.

Two labels will fit on a standard 3 1/2 x 15/16 inch label form, although some trimming is required for mounting on 35mm slides. If you plan on making a lot of slide labels it may be more convenient to buy specially designed labels which fit exactly on a slide mount. These can be purchased from: SlideScribe, 7141 Shady Oak Road, Minneapolis, MN 55344.

Try to plan your label making session to print your 3-line and 4-line labels in separate groups. When you switch between these two formats you should reposition the label in the printer, otherwise the printing will be slightly off center.

If you leave the text-entering screen and go either to the main or setup menu, you will notice that when you return to SINGLE, DOUBLE, or 4-LINE LABEL modes the label area is blank. Select SHOW LABEL and the current label in memory will be displayed.

Even though Photo LabelMaker is designed for printing photographic labels, you need not limit yourself to this one purpose. Use it anytime you need a small label with tiny print. Since I have my name and address as a fixed label, I can rapidly print several dozen return address labels with just a couple of keystrokes. ▲

Listing on page 35.

Gary Coppola of Budd Lake, New Jersey is a senior research chemist for a major pharmaceutical company. He has written two books and has over 75 scientific publications and patents. His TapeTime Label-Maker *appeared in the July, 1989 issue of* ***Antic***.

Mutant

By Kevin Steele

Turn that broken-down old joystick into a custom controller with these tips and instructions from an ace joystick dismantler.

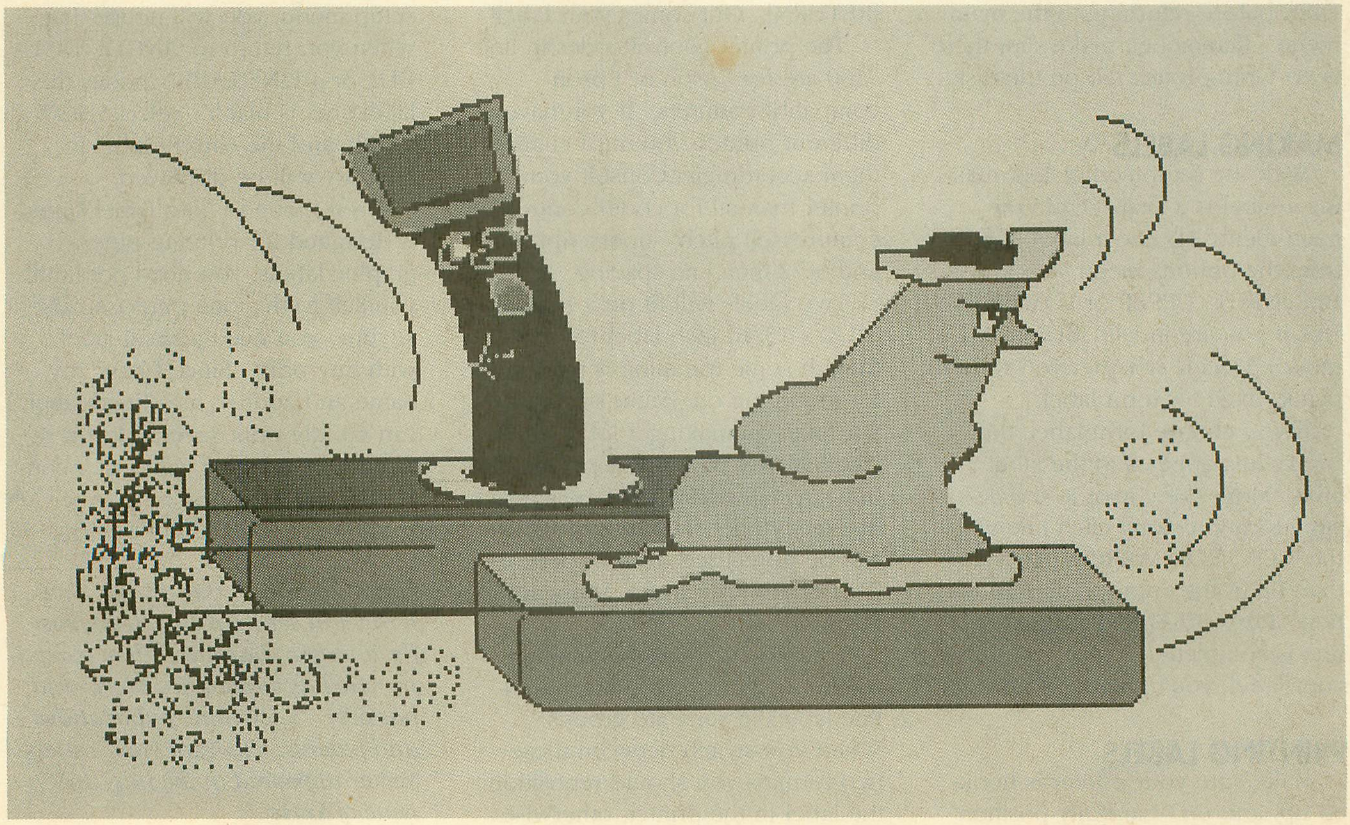


Illustration by Wendy Johnson

Joysticks

Customized game controllers you can build

As an avid video gamer, I am constantly annoyed by having to use a joystick to play a game that was never designed for a joystick. Pole Position comes to mind — have you ever tried to drive a car with a joystick? Unfortunately, alternative controllers are hard to find. A few ill-fated attempts have been made, such as the Atari Trackball, but without software support, these controllers are worthless.

So why not just adapt an old joystick to suit your needs? It's a lot easier than you think, and can be done with a minimum of money and time. All it takes is a little creativity, elbow grease, and time. I've created several alternative controllers, some with a specific game in mind, such as Pole Position. Others were simply creative tinkerings, but could possibly be used in a game of your own design.

WHAT'S INSIDE

Before we start building that dream controller, let's take a look inside your standard Atari joystick. The joystick case can be easily opened by using a Phillips screwdriver to unscrew the four screws holding the case together. Once you've opened the case, what you will discover is a printed circuit board attached to the joystick cable by six wires.

Notice that each of the attached wires is a different color — this will be important when you are wiring up your own creation. As the color of these wires sometimes changes from joystick to joystick, I'll identify them by location on the circuit board rather than color.

If you orient the board so that the fire button is in the upper left-hand corner, the third wire down on the right side should be the ground wire. Follow the copper traces on the board — the copper tracings from the ground wire go to all "blisters" on the board, which are the switches that tell the computer which direction you are pushing the joystick.

If you follow the traces for the other five wires, you will note that they correspond to the other joystick functions — up, down, left, right, and fire. These can be thought of as buttons or keys, and can be combined in any way you wish, unlike a standard joystick which is limited to pushing adjacent buttons together.

Make a note of what color wire corresponds to which joystick direction. By detaching these wires from the board and attaching them to your own custom switches, you can create a variety of controllers.

ARCADE ADAPTATIONS

The accompanying photo shows the Asteroids keypad that was my first attempt at a new controller. This is a fairly simple project, and only requires a keypad and a case which are easily obtainable at a local Radio Shack (or by mail from Jameco Electronics).

Step one is to lay out a template on a piece of wood or the case top to indicate where you would like the keys placed. You may want to play around with the key placement a bit, and adjust the key placement to whatever feels comfortable for you. Once this is done, use a jigsaw to separate the keys from the keypad, and a drill to drill

matching holes in the board or case top.

The keytops on my keypad were detachable, which helped in both the cutting and mounting of the keys. I used the larger "Zero" key off the keypad for the hyperspace key, to allow for a bigger panic target for my thumb.

Once you've drilled the holes and mounted the keys, you can then wire up the keys. The ground wire should go to one post on the back of all the keys, and the other post will be attached to the corresponding joystick wire. For example, the "down" wire will be attached to the second post on the Zero key, to allow for hyperspace when pressed.

Soldering the wires is best, but if the keys have long enough posts, simply wrapping the wire works well enough to let you test your wiring before committing to a solder job. Once the keys are wired, plug in the new controller and give it a brief test.

After you're sure all is well, you can build a case to match, or possibly find one that suits your needs. I built mine from wood, but you may find that a steel case from Radio Shack more suits your taste. The top surface of my case was designed to slope gently, like any normal keyboard would. This helps to relieve wrist stress during those long play sessions. Once you've played a game or two with your new controller, I'm certain you'll never use a joystick for Asteroids again.

This same technique could also be used to create a key-based controller for any game where a joystick is just too mushy for accurate control.

POLE POSITION

My next challenge, a controller that simulated a real steering wheel for the Pole Position game, proved to be a bit more challenging. True proportional steering was out, because the game worked only with "on" and "off" signals from the joystick. You push the joystick left, and the car pulls a hard left until you stop pushing left on the joystick. Nothing like "turn the car slightly left" was possible, except for flicking the joystick left in quick intervals, which was as close as you could get to a gradual left turn.

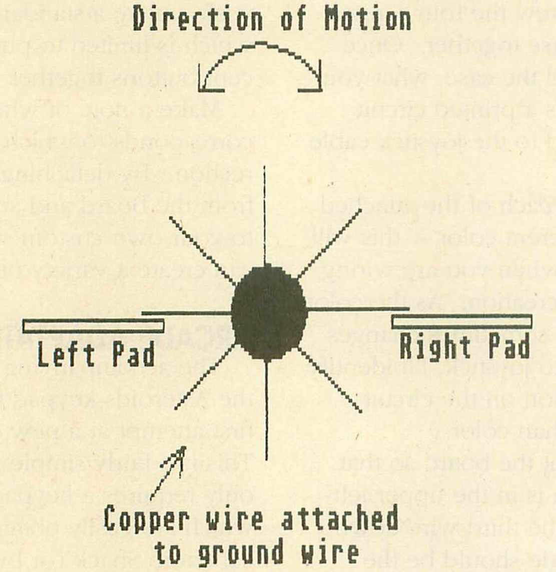


Figure 1: Driving Controller Design

That was what got me thinking — if I mounted a number of metal "leaves" around a 1/2" copper pipe, and placed two contact metal "pads" to the left and right of the pipe, (see *Figure 1*) I could simulate that pulsing joystick motion with a true steering wheel! As you turn the wheel left or right, the metal leaves touch the pads on the left or right, and the resulting contact accurately simulates joystick "pulsing."

I mounted this contraption on a board using two eye hooks, one mounted slightly lower than the other, and wired up one of the eye hooks to the ground wire. Two wood blocks held the metal contact pads near the pipe on the left and right. With a wooden disk as the steering wheel, and the fire button switch wired to a footswitch placed on the floor for the brake, I had my driving controller.

I kept the joystick wired in to use the up-down motion for the stick shift. The faster you turn the wheel, the faster the pulsing motion, and the more the car turns. While not perfect, it's a lot closer to real driving, and Pole Position's suddenly a lot more fun to play.

RUN FOR YOUR LIFE!

Several sports games have the player simulate running by toggling the joystick back and forth as fast as possible. This, to me, lacked the realism that I wanted while running for the gold. Besides, my joystick hand hurt. After one hand-cramp too many, I came up with a brilliant idea — why not rig up a joystick that also included two pads that you could place on the floor for the running portions of the game?

While the idea was simple, designing a good footpad was tough.

Finding a material to simulate the blister switches on the circuit board, something large enough and tough enough to be stepped on vigorously, was a challenge. Then I hit upon the answer — a rubber ball, in this case a medium-sized ball found in a toy store. I cut it so that I had a little less than half of the ball to work with, creating a rubber "dome" to be stepped on. I then epoxied a small circle of copper foil to the inner part of the dome, and a larger circle to a wooden board. After soldering wires to both copper pads, I then attached the dome to the board using a staple gun. The wires were attached to the contact points inside the joystick, and voila, I had a running board (See *Figure 2*).

Now all I had to do was hold the joystick in my hands. When the moment came in the game for the big race, I simply jumped on the board and started running. Not only had the game become a lot more fun, I was getting a much-needed workout in the process!

You'll probably have to experiment a bit on what kind of ball to use, and how thick to cut it, but once you've found a workable solution, I think you'll agree that this controller really adds that extra "something" to your Olympic competitions.

FANCIFUL PADDLES

Several of my controller designs weren't designed with any currently available game in mind. Rather, they are controllers that I would like to see utilized on the Atari. These are controllers I had seen in an arcade or simply ideas I came up with while working on other controllers. While these designs won't work with any of the commercial games currently available, they can be used as starting points for your own programming efforts. Who knows, perhaps one of these controllers will inspire you to create the next "Defender" or "Rescue on Fractalus"!

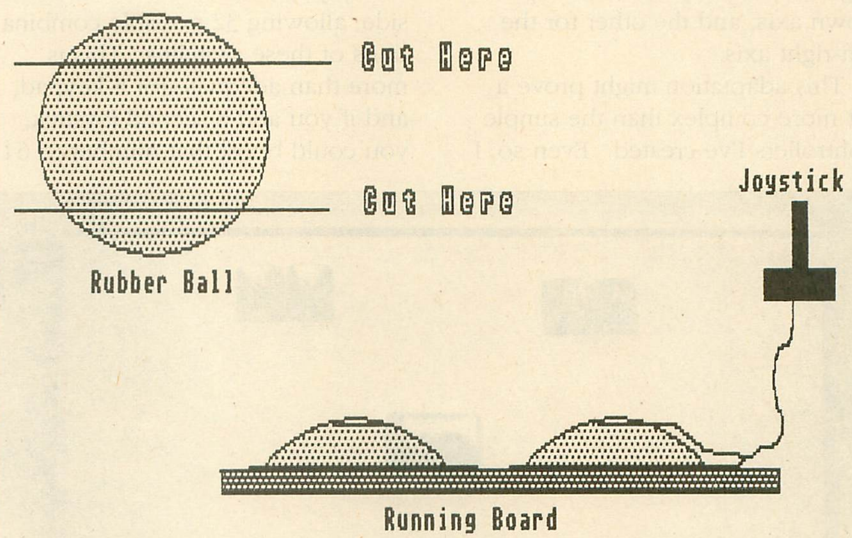
The Atari paddle controllers are hardly (if ever) used for games anymore. In fact, they were never extensively used at all, with the possible exception of a few games such as Breakout and Kaboom! for the 2600 game system. However, these controllers are potential powerhouses when it comes to game control.

The paddles return a value between 0 and 255, depending on how far they are turned. This allows for smooth, gradual movement. The fact that there are two paddle controllers per joystick port allows for a highly complex controller to be created, using options such as proportional bi-directional movement and dual fire buttons.

The first idea I had for applying the paddle controllers was imitating the controller used in the arcade "Star Wars" games. This controller looks similar to the flight control stick used in large aircraft. It allows for proportional left-right movement, as well as the ability to tilt the controller forward and back, to simulate dives and climbs.

With the Atari paddles, this controller is fairly simple to duplicate. Using one paddle for the left-right motion, and the other for the forward-back tilting motion, a good imitation of the Star Wars controller can be built. In addition, wiring each of the fire buttons to the hand grips allows for one button to be used for, say, lasers, while the other could be used for a bomb release. Now if only a game existed that could use this controller!

Figure 2: Running Controller Design



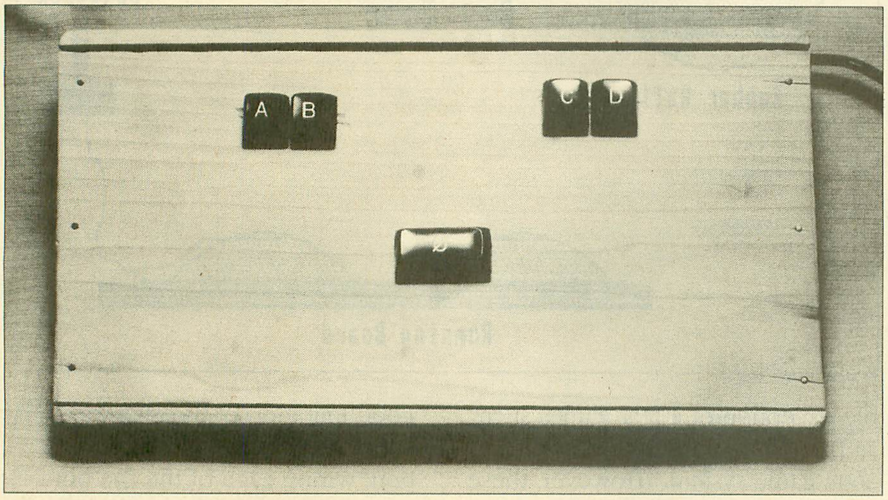
JOYSTICK FANTASIES

Another idea for a controller that uses an old paddle controller is a true proportional driving system. One paddle would be used for the steering wheel, while the other paddle could be adapted for use as a proportional gas pedal. Then, using one of the fire buttons as the brake, you could easily simulate an automobile. This simulation could even be taken a step further, adding a joystick for use as a stick shift.

Another idea, one I've not yet

tried, is to adapt a joystick from a Tandy Color Computer, Apple II, or an old 5200 game system. These joysticks are analog joysticks, which means they allow for proportional movements. I have always wanted this type of controller for my Atari system. These controllers could be adapted to work on a principle similar to the paddle controllers, using one paddle port for the up-down axis, and the other for the left-right axis.

This adaptation might prove a bit more complex than the simple controllers I've created. Even so, I mention it here as an inspiration to experiment on your own. If anyone has any success with adapting this type of joystick, let me know — I'd love to hear how you did it.



The author's handmade Asteroids controller — just like the controls in the coin-op version.

The paddle controllers can be the starting point for a multitude of controllers — anything that requires proportional movement, from turning a steering wheel, to swinging a bat or swiveling a tank turret. All these can be most accurately represented using a paddle. All that remains is to actually design a controller to fit the task, and perhaps write a program to use that controller.

The possibilities for joystick modification are endless. Since the joystick is simply a collection of switches, you can substitute your own switches in almost any possible combination. In fact, the number of possible key combinations is large enough to consider special projects, such as a detached keyboard or a "Twister" type playing mat.

A joystick has five switches inside, allowing 32 possible combinations of these switches. This is more than adequate for a keypad, and if you add a second joystick, you could boost that number to 64 or a mind-boggling 1,024 keys, depending on whether you keep the joystick switches separate between joysticks, or cross-wire the switches between joysticks for more possible combinations.

This allows for such projects as a pressure-sensitive chess board. For a game board based on the board game "Operation," each button could be used for an "organ" on a patient's body. The ground wire would be attached to the "scalpel" to detect a mishap. Combined with appropriate sound effects, this could prove to be a wonderful computer game.

Your controllers don't have to be limited to game-based ideas. In fact, with a home-brewed software driver, a spare keyboard (available through some mail-order houses), and a little creativity, a detached keyboard could theoretically be created. I've yet to attempt this ambitious a project, but don't let that stop you — joystick projects are relatively simple in comparison to other hardware projects. It is also very difficult, if not impossible, to damage your computer with your joystick creations. Just don't add any additional voltage to the switches, and you should be fine.

Another avenue of thought for joystick projects is to substitute simple switches for more complicated ones. Light-activated, magnetic, velocity-sensitive — the possibilities are endless. Sometimes, good ideas for joystick projects can be found simply by browsing electronics catalogs, and figuring out ways to adapt the electronic hardware you find into a joystick for your Atari system.

If there is one guideline for joystick projects, it is to be creative — I've often found myself inspired to write software simply to support some new contraption I've wired up, as well as being inspired to design a controller to support game software already written. Armed with the basic knowledge of how joysticks and paddle controllers work, together with a little creativity and imagination, the sky's the limit.

(Please note that Antic Publishing, Inc. is not responsible for any damage that might result from your experiments with the methods described in this article. – ANTIC ED)

Kevin Steele is a freelance technical writer in Cleveland, Ohio. He can often be found on GEnie — his address is K.B.STEELE. His More Secrets of AtariWriter Plus *appeared in the June, 1988* ***Antic***.

StatWhiz

Analyzing numerical data with your Atari

By Bernard Sparks, III

Got some data you need to interpret? Now your Atari can find far more than just the average of your figures. If you know your way around regressions, correlations, ANOVAs and T-Tests, you can thoroughly analyze your statistics with StatWhiz. This BASIC program runs on an 8-bit Atari with a minimum of 48K and disk drive.

Statistics play a vital role in modern society. Everything from the movies people rent to the toothpaste they prefer is studied at one time or another. When all the information has been gathered, statistics provide the tools needed to interpret your data. At its most basic level, General Statistics will take the data for a single group and give you the maximum, minimum and mean (average) values, as well as the variance and standard deviation.

StatWhiz is a BASIC program which brings the power of statistical analysis to the 8-bit Atari computers. StatWhiz is easy to use — if you have at least some knowledge of statistical methods and terminology. For example, StatWhiz supports both descriptive and inferential statistics and offers both independent and dependent T-test, as well as one and two-way ANOVA, chi square, Pearson correlation, and regression.

GETTING STARTED

Type in STATWHIZ.BAS, Listing 1, check it with TYPO II, and save a copy to disk before you RUN the program.

After the title screen, the main menu presents the statistical functions available in StatWhiz. Pressing the letters A-H will access the corresponding test. You will then be presented a sub-menu of the following options:

CREATE DATABASE - Initially, you will need to develop a database from which to perform your analysis. Entering the data is quite easy, as the program will prompt you through the various steps. Press [RETURN] after each data entry. Answer the prompts by pressing the appropriate letter. (No [RETURN] is necessary.) All sample data must be continuous, with a maximum of 225 subjects per sample group.

Often, you can enter or load your data in one module and then

use it in another – if the number of groups and subjects are compatible. The limits for sample group size are as follows:

TEST:	# SAMPLE GROUPS:
Gen. Statistics	1-8
T-test (I)	2
T-test (D)	2
One way ANOVA	2-8
Two way ANOVA	2-8
Chi Square	2-4
Correlation	2
Regression	2

For the dependent T-test, two-way analysis of variance (ANOVA), Pearson correlation, and regression, the sample groups must have an equal number of subjects. Additionally, the two-way ANOVA requires that the sample groups have an *even* number of subjects.

The size of a chi square is limited to a minimum 2 x 2 and maximum 4 x 4 contingency table. The data for a 2 x 2 table would be coded in as two sample groups of two subjects each. The values of each subject would reflect the individual cells of the chi square.

MODIFY DATABASE - This option allows you to change the data values in a given sample group. The program will prompt you through the steps.

LOAD DATABASE - This option lets you load an already entered database from disk. Each test module saves its data with a different filename, but you can still load the database while in one test module and then go to another to analyze it. For example, you could load a set of data from the regression function and then perform a correlation on it.

ANALYZE DATABASE - Selecting this option results in the chosen analysis being performed on the data. Of special note is the way StatWhiz handles a two-way ANOVA. The program will split the data at the mid-point and then treat the values as the two rows of the ANOVA.

Each inferential test will also provide a probability, or P-value. If the P-value is smaller than the selected level of confidence, it indicates a significant difference in the means of the sample groups. Any assumptions that the samples were drawn from the same population must be rejected.

ABOUT STATISTICS

StatWhiz is basically an 8-bit Atari translation of several commonly used statistical formulas. These tests allow you to describe and make inferences about a larger population by sampling a subset of it. The specific outputs of the program are as follows:

MEAN - This is the arithmetic sum of the sample values divided by the number of values. It results in the average sample value.

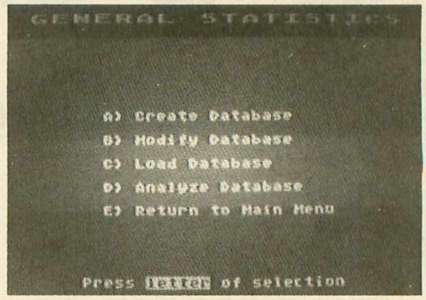
VARIANCE - This is the degree to which independent samples differ from the average sample value. Variance is calculated by squaring the difference between the sample value and the mean, summing the squares, and dividing by the number of sample values.

STANDARD DEVIATION - The standard deviation is obtained by taking the square root of the variance. It provides a stable range of variance in terms of the original sample measurements.

RANGE - The range is the simplest measure of variance. In StatWhiz, the range is provided by the maximum and minimum sample values. The range has limited value in large samples but may assist in testing the significance of small samples.

INDEPENDENT T-TEST - The Student's t or T-test allows you to evaluate two independent samples for significant differences between their means. An example would be the sprint times of two groups of athletes running under different conditions.

In order to evaluate the significance of the calculated t value, you will need the table of critical t values which is listed in most books on statistics. If the calculated t value is greater than the tabled value for t, the difference between the sample means is significant – in other words, the differences did not occur because of chance.



Stat Whiz Menu

DEPENDENT T-TEST - When subjects are tested before and after exposure to experimental conditions, changes in their performance can be evaluated by a dependent T-test. The analysis of the dependent t value is the same as for the independent t. However, both T-tests assume the sample values were drawn from a population with a normal distribution.

ONE-WAY ANOVA - A one-way analysis of variance is used to test the significance of the differences between means of several different sample populations.

StatWhiz can calculate up to eight sample groups of 225 subjects each. The resulting F value must be interpreted using the table of critical F values found in most statistics books. As with the t value, if the calculated F value is greater than the critical F, the difference in sample means is significant and, in all likelihood, did not result from chance. An example of a one-way ANOVA would be the assessment of growth rates for a single strain of

grass grown in four different types of soil.

TWO-WAY ANOVA - A two-way ANOVA measures two experimental variables at the same time. StatWhiz employs a complex formula to calculate this interaction and unfortunately is quite slow.

The output of this test yields three F values (row, column and interaction). Each must be evaluated separately for significance using a table of critical F values. The program assumes an equal, even number of subjects in each sample group. An example of a two-way ANOVA would be the growth effects of sunlight and darkness on three different strains of grass seed (slow, medium, and fast growing).

CHI SQUARE - This test allows you to compare observed with theoretical frequencies. It is a non-parametric statistic which is independent of normal distribution expectations. The calculated X^2 value must be evaluated using a table of critical X^2 found in most statistics texts. If the calculated X^2 exceeds the critical X^2, the observed differences are significant and did not happen by chance. For small samples with cell values of less than 5, the program employs the Yates correction for continuity. This improves the validity of the calculated X^2.

CORRELATION - This is the degree to which sample values relate to each other. StatWhiz calculates the Pearson product-moment correlation coefficient. A perfect, positive correlation results in an r value of 1. A perfect, negative correlation is evidenced by an r value of -1. The closer the r value is to 0 the less likely a relationship exists.

REGRESSION - When a correlation exists, predictions can be made concerning one value when another one is known. This linear relationship is illustrated by a regression. The output equation of StatWhiz allows you to make predictions from related data, such as predicting a student's test score based on a knowledge of his IQ score.

I wish to acknowledge that the routines for calculating P-values were modeled after Dr. Tracy Gustafson's excellent public domain program for the IBM PC, Epistat. ▲ *Listing on page 40.*

Bernard Sparks, III is Director of Externships and a member of the clinical faculty at Southern College of Optometry in Memphis, Tennessee. He uses his Atari 800 system to manage student files and schedules.

Secrets of PaperClip 2.1

By Craig Zawada

Get the most from this popular word processor with these special tips and hints

Powerful, friendly PaperClip offers many features still unavailable in high-priced software running on high-priced computers. With the undocumented tricks you'll learn from this article, now you can get even more from this classic word processor.

If you had your computer for any length of time, you have probably found yourself on a quest for your perfect word processor. Some people have boxes full of word processors they accumulated while trying to find the one piece of software that fits their exact needs.

Well, the perfect word processor probably doesn't exist, no matter what the ads tell you. Just the same, there are a number of top-notch word processing programs for Atari 8-bit computers. One of the best is PaperClip, formerly distributed by Batteries Included (Electronic Arts). Although it is no longer available from the manufacturer, various sources such as mail order houses still offer copies for sale. Certainly, many Atari users still rely on this high-powered software.

I personally use PaperClip and my wife uses it in her typing service. After three years with it, we have discovered many quirks as well as a few shortcuts. I would like to share our discoveries with other PaperClip users.

I use version 2.1 on an Atari 130XE computer, so my suggestions are guaranteed for that final incarnation of Paper Clip. However, most recommendations should also apply to earlier versions.

PRINTER DRIVERS

PaperClip loads a configuration file (with a .CNF extender) to customize itself for your printer. Many .CNF files come with PaperClip, each for a different printer. Chances are that your printer will be listed. If it isn't (perhaps you have a newer printer), you can try different drivers to see if any do the trick— Epson drivers are reasonably generic, for instance.

If none of the .CNF files provided works with your printer, you will have to use the PRTR.COM utility to build your own driver. Usually, it is easiest to take an existing .CNF file from a printer that you know is roughly compatible, and change the necessary entries.

Some features of PRTR.COM aren't well explained in the otherwise excellent PaperClip manual. For example, if your printer has a

specific command to enable italics, set the offset to zero. Otherwise you will get "garbage" italics. The offset is only used if your printer defines italics in terms of a different ASCII code, instead of using an "italics on/off" command.

I have had good results on my Star NP-10 by making Near Letter Quality the "optional" font. If you like, NLQ can be set up as a user-defined command (depending on your printer), although this makes the command harder to remember.

UNDERLINES

Some printers tend to print stray underline characters at the beginning of a line. This occurs most often when you are not using single spacing, and an underlined phrase is broken up at the printed word-wrap. (Don't confuse this with the screen's word wrap.) PaperClip doesn't turn off underlining until it reaches the next *printed* line. When double-spacing, the blank line between printed lines will still be subject to underlining, which can cause an underline to print before the second carriage return takes over.

The simplest way to avoid straying underlines is to check the document with Print Preview. If any underlined phrases carry over onto another line, turn off the underlining immediately after the last word on the printed line, and turn it back on immediately before the next word.

A second solution is to modify the printer driver, setting the underline command to all nulls. This forces PaperClip to underline characters by backspacing over each character and printing a separate underscore character. Though this method saves you from having to Print Preview each document, the underlining is slower, and you will sometimes get gaps in your underlining, especially with NLQ printing.

PRINT PREVIEW

Whenever you finish a Print Preview of a document, PaperClip returns you to the beginning of the document, not the place where you were just editing. With PaperClip 1.0, it would also erase any place-marking Tags you had set. If you were editing a lengthy document, you could waste a lot of time just relocating your cursor.

Fortunately, with PaperClip 2.1 you can just drop a Tag by pressing [CONTROL-SHIFT-T] at your current cursor position before entering Print Preview. When you exit Print Preview, just Go [CONTROL-G] to the tag. This saves a lot of time when lining up charts and tables, which require a lot of flipping back and forth.

TYPING

For the most part, PaperClip works smoothly and quickly. I have found, however, that the program will repeat or drop letters at the word wrap if you are a fairly speedy typist. I have only found a couple of stopgap measures to alleviate this annoying problem. First, keep your key-click turned on. Your subconscious will usually pick up the faster click of the extra characters.

Second, keep your files as short as possible, since the problem seems to get worse with large documents. I know that a 130XE gives you 80K of free RAM, but there are few documents that can't be logically separated into smaller sections of 20K or so. Besides, large files take forever to save and load, and you can't load them with a 64K computer. If you need a single file, you can always append your smaller files to one another when you finish editing.

SPELLPACK

PaperClip 2.1's SpellPack is the best spelling checker I've used on the 8-bit Atari. The fact that it is always memory resident makes using it a real pleasure. However, there are a few tips to keep in mind.

Remember that the cursor control keys are still active when you are retyping a word. This can save retyping a long word simply because one letter is out of place.

If you wish to save any learned words to your own personal dictio-

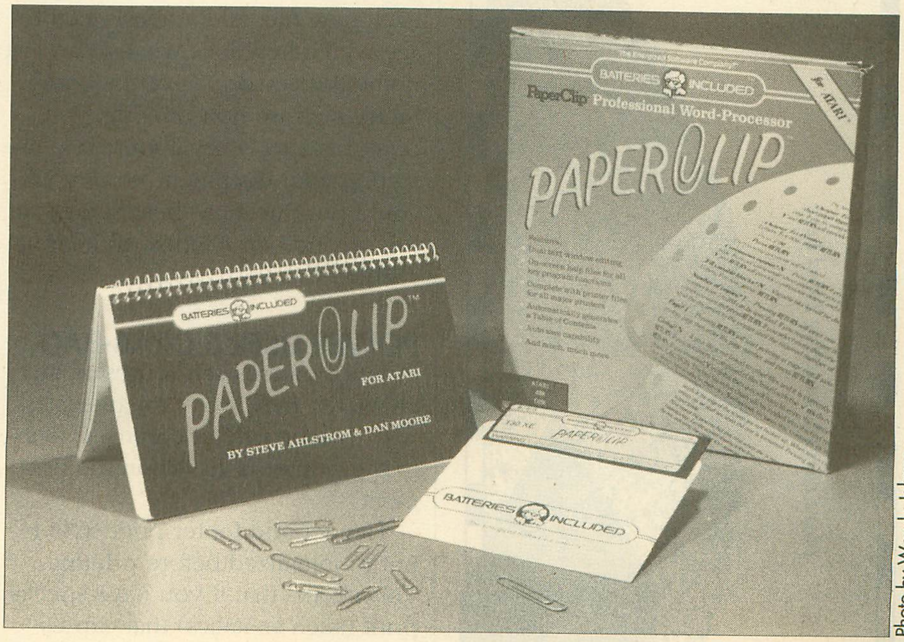


Photo by Wendy Johnson

PaperClip— 8-bit Atari word processing at its best.

nary file, make sure you save them before exiting SpellPack. If you don't, the words will be lost and you will have to re-check the document to get them back. Finally, a learned dictionary can be loaded like a regular file, so you can add or delete words as you see fit.

COMMENT LINES

Comment lines are probably the most underutilized resource in PaperClip. Activated with a [CONTROL-Z][.], they are simply lines that do not print out and are roughly akin to a BASIC REM statement.

Longtime word processor users often have different templates for letters, essays and what have you. I use comment lines in all my templates to help remind me of their purpose. It beats squinting at control codes, and endless references to the printer manual.

Comment lines are also great for use with macros, as a kind of onscreen help file. It seems I can never remember which macro key stands for what. Therefore, I simply set up one macro (e.g. [START-1]) as a comment list of all the other macros in the file. I just press that macro key at the beginning of each new file, and when I need to see which key does what, I can just home the cursor. Since the comment lines are non-printing, you don't have to worry about them affecting your document — or you could put this mini "help screen" in the second edit window to keep it visible.

POWER USER'S GRAB-BAG

Since macros can represent any character, they are often an easier way to send printer control codes to the printer from within the document.

Header and footer print style is not re-initialized before printing. This means that if you have special print (such as italics) that carries over to a new page, any footer or header caught between the italicized text will also be in italics. To avoid this you must turn the special function off and on at the page break.

Note that you can include special print commands in the header/footer itself, adding an extra touch of class to a document. Just be sure to turn the special print off at the end of the header/footer.

You probably know that [SHIFT-CONTROL-F] will let you enter a word to find. Once PaperClip finds that word, you can simply repeat the command to find the next occurence of the same word. To find a *different* word, you must press at least one key first ([ESC] will work).

With PaperClip 2.1 you don't have to use the [SHIFT-CONTROL-?] option to look through a pile of disks for a particular file. Instead, go to DOS (with the [OPTION] key) and then press the number of the drive to be cataloged. The advantage is that you do not have to clear the window to read a new directory — just press the number key again. (This option is not available in PaperClip 1.0.)

A sporadic bug affects the Clear function. Normally, the [ESC] key allows you to abort gracefully if you accidentally press [SHIFT-CLEAR]. However, if the cursor is near the end of a line, you might lose some characters after you press [ESC]. Sometimes that portion of the line won't be deleted until you move the cursor around. Be warned.

Craig Zawada is a lawyer in Saskatoon, Saskatchewan, Canada. After waiting years for ***Antic*** *to come up with a "Secrets" article for PaperClip he finally decided to write one himself. We encourage other PaperClip users to send in any tips they've discovered over the years. (Be sure to specify which version of PaperClip you are using.)*

PULL-DOWN MENUS

By Marc Abramowitz

Your Atari gets to use one of the most popular techniques in modern software — pull-down menus!

This short demonstration program clearly explains how BASIC programmers can use pull-down menus in their own programs. This BASIC program works on all 8-bit Atari computers with at least 48K memory and disk drive.

Much of the new software written for the IBM, Atari ST, and other business computers is now using something called pull-down menus, or drop-down menus. This technique is probably the best menu interface system for speed and ease of use.

This type of system is fairly simple to use. The choices for the main menu are displayed horizontally on a bar at the top of the screen. The user can highlight one of the choices with the keyboard, joystick or mouse. Pressing a button generally causes a sub-menu to be "pulled" out from the top of the screen. Choices may be made on that menu by highlighting a selection and then pressing (or releasing) a button. Or the user can move the cursor back to the main menu at the top, or move over and see the sub-menu of another choice.

Different computers and programs may use slightly different systems, but all of them offer the advantage of being able to see the sub-menu of a menu choice without selecting it. In a conventional program, you would have to make a selection, see that you don't want one of the selections on the sub-menu, press a key to get back to the main menu, and try the other selections. A pull-down menu system makes it far easier to find what you're looking for, particularly if there are many menus within menus.

I decided to try writing my own pull-down menus for my 8-bit Atari, and the result is Pull-Down Menus, an example of the use of these menus in a simple, fake drawing program. This is *not* a working graphics program, but rather a demo of subroutines you can easily put into your own programs. Now you can include pull-down menus in your BASIC programs with very little work!

GETTING STARTED

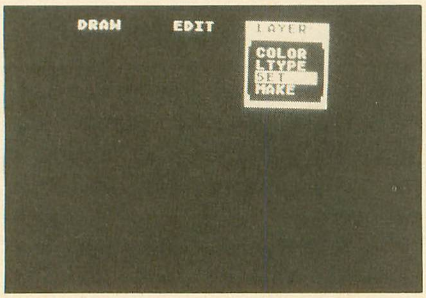
Type in PULLDOWN.BAS, Listing 1, check it with TYPO II and SAVE a copy to disk before you RUN it.

If you have trouble typing the special characters in line 470, don't type them in. Instead, type in Listing 2. When Run, this program creates these hard-to-type lines and stores them in a file called LINES.LST. To merge the two programs, type NEW, then LOAD "D:PULLDOWN.BAS", Listing 1, and then ENTER "D:LINES.LST." Be sure to SAVE the completed program.

PULLING MENUS

When you RUN Pull-Down Menus, you will see the words DRAW, EDIT and LAYER at the top of your screen. Using a joystick or your cursor keys, you can move the highlighted bar left and right, from one word to another. Press the joystick trigger or [DOWN ARROW] without [CONTROL] to pull down a submenu. (Be careful to only press the joystick trigger once.)

Pressing [ESC] while in a submenu will return you to the top menu. Moving left or right while in a submenu will move you to the next submenu.



Pull-Down Menus in action

Highlight your choice in the submenu, and select it with the joystick trigger or [RETURN]. Since this is strictly a demo, the program will simply write the name of your choice on the screen. Press the joystick trigger or [RETURN] to try it again.

Now that you've seen how pull-down menus work, you should be ready to try putting pull-down menus into your own programs. To make it easier for you to use these subroutines, I've included a list of variables and some comments on the program's structure.

VARIABLES

B - Background color; change to any number you wish from 0-255

T - Brightness of text; use values from 0-14; 14 for brightest

A$ - A string used for handling the highlighting bar; do not change

M$ - A string used for storage of menu data; can be changed

N - Number of items in the current menu

XM - Horizontal position of menu

FL, FL2 - Flags

A, Y2 - Used to find specific menu items in A$ or M$

ST, TR, K - Joystick, trigger, and keyboard

X, Y - Horizontal & vertical location of highlighting bar

I - used for loop in 310-320

INV - location of ML routine that inverts text

CUSTOMIZING

To customize the program for your own use:

1. Change B and T to whatever color values you wish.

2. Store menu items in M$. Each item must be nine characters long, so shorter items should be padded with spaces. You may add the spaces before or after the item.

3. After each M$="...." command, you must put the number of items in the menu in N and the horizontal location in XM. You may want to center top menus, while aligning submenus under their main menu choices, as I did.

4. GOSUB 180 (top menu) or GOSUB 300 (sub-menu)

5. If you want more or less than three items in the top menu, you will have to add or delete lines in lines 130-150.

The program is relatively simple,

You can see sub-menu choices before selecting.

so it should be easy to modify to fit your needs. My machine language routine at the end has numerous uses outside this program. The format for the USR command is:

DUMMY=USR(INV,ADR,NUM)

Here ADR is the address of the string or memory locations to be inverted and NUM is the number of consecutive bytes to invert. This routine will not invert [CONTROL] characters, etc. All it does is add 128 to all specified bytes.

PROGRAM BREAKDOWN

100-110 = Setup and jump to 470 to read in ML routine

120 = Data for main menu; jump to 180

130-160 = Read in data for appropriate sub-menu based on menu selection and then jump to 300

170-174 = Print final choice, then wait for [RETURN] or joystick trigger press to RUN program again

175-280 = Draw main menu and handle selection

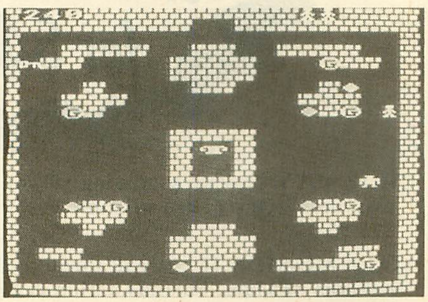
290-450 = Draw and handle submenus 460-470 = ML invert text routine ▲ *Listing on page 43.*

Marc Abramowitz lives in Staten Island, NY. His game, Red Squares, *appeared in the July, 1989 issue of* **Antic**.

Caverns of the Minotaur

By Rufus Reynolds

Collect gold and diamonds while avoiding the dreaded man-bull



In this arcade-style BASIC game, you get to outrun the classic monster of ancient Greece. Caverns of the Minotaur works on all 8-bit Atari computers with at least 48K memory and disk

You've managed to sneak your way into the fabled caverns of King Minos. Here beneath the ground, gold and diamonds been stashed away in corners and niches, ripe for the taking. One problem — the ferocious minotaur has scented you. Half-man, half-bull, this tenacious creature will not rest until it destroys you. Fortunately, the minotaur is not that bright, at least in the early levels...

GETTING STARTED

Type in MINOTAUR.BAS, Listing 1, and check it with TYPO II. Be sure to SAVE a copy before you RUN the program. Plug in your joystick, and you're ready to face the minotaur.

The object is to collect as much gold and diamonds as possible and bring the stash to the altar room while avoiding the clutches of the minotaur. It may sound easy, but beware! After you complete each level, the minotaur becomes smarter, and eventually it will take an expert arcade player to outmaneuver the beast.

There are only two basic floor plans in this maze (the ancient builders weren't too imaginative) but there's an unlimited number of rooms for you to loot. On each level, two color-coded keys appear in the maze sometime during the game. One key opens the secret passages on the sides of the screen, making it easier to avoid the minotaur. The other key will let you into the altar room – the only route to the next level.

Once you have the keys, position yourself either beside the side passages or just below the altar room and press the joystick button. The wall will disappear, showing the passage. The side passages you jump from one side of the screen to the other, leaving the minotaur far behind – for a little while, at least.

When you reach the altar, you will be magically transported to the next level, where you can continue gathering your treasure. Just beware – the minotaur learns slowly, but surely. You'll have to step lively to beat him.

Listing on page 39.

Rufus Reynolds III of Clinton, Maryland is 19 years old and has been programming his Atari for approximately five years.

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BACKTALK1.2 - The Atari becomes a communications droid with the macro command feature. **(APO154)..*$19.95***

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SOLID OBJECT MODULE - Create 3D objects easily. Requires 48K RAM and RAMbrandt. **(APO182)..*$15.95***

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SPEEDREAD+ - Learn to read faster with less effort. *Requires 48K RAM.* **(APO164)..*$19.95***

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SOFTWARE LIBRARY

TYPING SPECIAL ATARI CHARACTERS

The Atari Special Characters and the keys you must type in order to get them are shown below:

For [CONTROL] key combination, *hold down* [CONTROL] while pressing the next key. For inverse [CONTROL] [A] through [CONTROL] [Z], press the [◪] key—or [人] on the 400/800—then *release* it before pressing the next key. (Press [◪] or [人] again to turn off inverse.) For [ESC] key combinations, press [ESC] and then *release* it before pressing the next key.

Carefully study the chart above and pay close attention to differences between lookalike characters such as the slash key's [/] and the [CONTROL] [F] symbol [◩].

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL S
	CTRL A		CTRL T
	CTRL B		CTRL U
	CTRL C		CTRL V
	CTRL D		CTRL W
	CTRL E		CTRL X
	CTRL F		CTRL Y
	CTRL G		CTRL Z
	CTRL H		ESC ESC
	CTRL I		ESC CTRL −
	CTRL J		ESC CTRL =
	CTRL K		ESC CTRL +
	CTRL L		ESC CTRL *
	CTRL M		CTRL .
	CTRL N		CTRL ;
	CTRL O		SHIFT =
	CTRL P		ESC SHIFT CLEAR
	CTRL Q		ESC DELETE
	CTRL R		ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS
	ESC SHIFT DELETE
	ESC SHIFT INSERT
	ESC CTRL TAB
	ESC SHIFT TAB
	人 CTRL .
	人 CTRL ;
	人 SHIFT =
	ESC CTRL 2
	ESC CTRL DELETE
	ESC CTRL INSERT

TYPO II AUTOMATIC PROOFREADER

TYPO II automatically proofreads **Antic**'s type-in BASIC listings. Type in the listing below and SAVE a copy to disk or cassette. Now type GOTO 32000. At the prompt, type in a single program line **without the two-letter TYPO II code at the beginning**. Then press [RETURN].

Your line will reappear at the bottom of the screen. If the TYPO II code does not match the code in the magazine, then you've mistyped your line.

To call back a previously typed line, type [*], then the line number, then [RETURN]. When the completed line appears, press [RETURN] again. This is how TYPO II proofreads itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000. To remove TYPO II from your program, type LIST "D:FILENAME",0,31999, then [RETURN], then NEW, then ENTER "D:FILENAME", then [RETURN]. Now you can SAVE or LIST your program to disk or cassette.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

PHOTO LABELMAKER

PRINT TINY LABELS JUST RIGHT FOR YOUR 35MM SLIDES

Article on page 15

LISTING 1

Don't type the TYPO II Codes!

```
JA 1 REM PHOTO LABELMAKER
WY 2 REM BY GARY COPPOLA
LB 3 REM (c)1990, ANTIC PUBLISHING INC.
JZ 8 DIM ULBL1$(28),ULBL2$(28),ULBL3$(28),ULBL4$(28),LLBL1$(28),LLBL2$(28),LLBL3$(28),LNUM$(2),PROMPT1$(9)
GR 9 DIM PROMPT2$(9),PROMPT3$(9),FOUR1$(9),FOUR2$(9),FOUR3$(9),FOUR4$(9),MOVE$(20)
MF 10 DIM FPMT1$(9),FPMT2$(9),FPMT3$(9),F4PMT1$(9),F4PMT2$(9),F4PMT3$(9),F4PMT4$(9)
WT 11 DIM FIX1$(28),FIX2$(28),FIX3$(28),FIXF1$(28),FIXF2$(28),FIXF3$(28),FIXF4$(28)
US 12 DIM FRM1$(28),FRM2$(28),FRM3$(28),FRM41$(28),FRM42$(28),FRM43$(28),FRM44$(28),A$(7),B$(7)
LM 13 ULBL1$=" ":ULBL2$=" ":ULBL3$=" ":ULBL4$=" ":LLBL1$=" ":LLBL2$=" ":LLBL3$=" ":A$="▮LABEL":B$="▮MAKER▮"
MN 14 GOTO 7510
KF 15 FIX1$=" A FIXED LABEL has not been"
HC 16 FIX2$="          created yet"
ZF 17 FIX3$="  Please go to LABEL SETUP"
LZ 18 FIXF1$=" A FIXED LABEL has not been "
IN 19 FIXF2$="          created yet"
OF 20 FIXF3$="    This can be done under"
BV 21 FIXF4$="          LABEL SETUP"
KM 22 FRM1$=" A FORM LABEL has not been"
LV 23 FRM2$=" created yet. Press [RETURN] "
CS 24 FRM3$=" (3x) then go to LABEL SETUP "
FC 25 FRM41$=" A FORM LABEL has not been"
CR 26 FRM42$="          created yet"
VD 27 FRM43$="    Press [RETURN] 4 times"
DK 28 FRM44$="  then go to LABEL SETUP"
EY 30 PROMPT1$=" Line #1 ":PROMPT2$=" Line #2 "
CJ 31 PROMPT3$=" Line #3 "
CA 32 FPMT1$=" Line #1":FPMT2$=" Line #2"
RQ 33 FPMT3$=" Line #3"
HW 34 FOUR1$=" Line #1":FOUR2$=" Line #2"
OW 35 FOUR3$=" Line #3":FOUR4$=" Line #4"
SK 36 F4PMT1$=" Line #1 ":F4PMT2$=" Line #2 "
AA 37 F4PMT3$=" Line #3 ":F4PMT4$=" Line #4 "
ID 40 GRAPHICS 0:DL=PEEK(560)+256*PEEK(561):POKE 756,GT:POKE DL+8,6
OK 50 POKE 82,0:POKE 83,39:POKE 764,255:POKE 752,1:SETCOLOR 2,0,2:CLOSE #1:OPEN #1,4,0,"K:"
ZU 60 POSITION 11,1:? "PHOTO LABELMAKER":POSITION 5,3:? "MAIN MENU"
WA 70 POSITION 31,6:? "1 - SINGLE LABEL":POSITION 31,8:? "2 - DOUBLE LABEL":POSITION 31,10:? "3 - 4-LINE LABEL"
LX 80 POSITION 31,12:? "4 - LABEL SETUP":POSITION 31,14:? "5 - QUIT"
EI 90 POSITION 25,18:? "PICK THE NUMBER OF YOUR CHOICE"
OH 100 PICK=PEEK(764):GET #1,PICK:TRAP 60:IF PICK=255 THEN 100
KU 110 IF PICK-48>5 OR PICK-48<1 THEN 60
DE 120 ON PICK-48 GOTO 140,200,300,6000,7800
PZ 130 TRAP 40000:POKE 764,255:POKE 752,1:CLOSE #1:OPEN #1,4,0,"K:":RETURN
TQ 139 REM SINGLE LABEL
KR 140 LABEL=1:GOSUB 2000:GOSUB 2035:FOR Q=1 TO 100:NEXT Q:GOSUB 2050:GOSUB 2100
SO 150 GOSUB 500
SI 160 GOSUB 130
JR 170 OPT1=PEEK(764):GET #1,OPT1:TRAP 160:IF OPT1=255 THEN 170
YH 180 IF OPT1-48>4 OR OPT1-48<1 THEN 160
KG 190 ON OPT1-48 GOTO 1000,2500,7100,40
RW 199 REM DOUBLE LABEL
OG 200 LABEL=2:GOSUB 2000:GOSUB 2035:GOSUB 2040:GOSUB 2050:GOSUB 2100:GOSUB 2120:GOSUB 2160
SS 210 GOSUB 600
SB 220 GOSUB 130
BK 230 OPT2=PEEK(764):GET #1,OPT2:TRAP 220:IF OPT2=255 THEN 230
VR 240 IF OPT2-48>5 OR OPT2-48<1 THEN 220
TN 250 ON OPT2-48 GOTO 1000,1050,2500,7100,40
ZS 299 REM 4-LINE LABEL
YO 300 LABEL=4:GOSUB 2000:GOSUB 2035:FOR Q=1 TO 100:NEXT Q:GOSUB 2180:GOSUB 2220:GOTO 150
MW 499 REM SINGLE AND 4-LINE OPTION MENU
QP 500 POKE 82,2:POSITION 2,7:? "▮▮▮OPTIONS▮▮▮":GOSUB 520:? "▮1▮LABEL▮INPUT▮":GOSUB 520:? "▮2▮SHOW▮▮LABEL▮"
VM 510 GOSUB 520:? "▮3▮PRINT▮LABEL▮":GOSUB 520:? "▮4▮MAIN▮MENU▮▮":? "▮▮▮▮▮▮▮▮▮▮▮▮▮▮":RETURN
VM 520 ? "▮▮▮▮▮▮▮▮▮▮▮▮▮▮":RETURN
YD 600 POKE 82,2:POKE 752,1
XG 610 POSITION 2,6:? "▮▮▮OPTIONS▮▮▮":? "▮1▮UPPER▮LABEL▮":GOSUB 520:? "▮2▮LOWER▮LABEL▮":GOSUB 520
YH 620 ? "▮3▮SHOW▮▮LABEL▮":GOSUB 520:? "▮4▮PRINT▮LABEL▮":GOSUB 520:? "▮5▮MAIN▮MENU▮▮":? "▮▮▮▮▮▮▮▮▮▮▮▮▮▮":RETURN
AZ 650 POKE 82,3:POSITION 3,7:? "▮▮▮▮▮▮▮▮▮▮▮▮":? "▮LABEL▮TYPE▮":? "▮▮▮▮▮▮▮▮▮▮▮▮":? "▮1▮BLANK▮▮":? "▮▮▮▮▮▮▮▮▮▮▮▮"
GG 660 ? "▮2▮FIXED▮▮":? "▮▮▮▮▮▮▮▮▮▮▮▮":? "▮3▮FORM▮▮▮":? "▮▮▮▮▮▮▮▮▮▮▮▮":RETURN
SP 670 GOSUB 130
GN 680 LT=PEEK(764):GET #1,LT:TRAP 670:IF LT=255 THEN 680
CD 690 IF LT-48>3 OR LT-48<1 THEN 670
XX 700 ON LT-48 GOTO 5000,5380,5560
OK 800 FOR W=1 TO 320:NEXT W:RETURN
GG 820 FOR J=1 TO 4:SOUND 0,10,8,20-J*5:NEXT J:SOUND 0,0,0,0:FOR W=1 TO 50:NEXT W:X=X+1:RETURN
EG 830 FOR J=15 TO 0 STEP -1:SOUND 0,120,10,J:NEXT J:RETURN
QJ 999 REM UPPER LABEL INPUT
EZ 1000 LPOS=1
IC 1010 GOSUB 2260:GOSUB 650:GOTO 670
CT 1049 REM LOWER LABEL INPUT
CE 1050 LPOS=19:GOSUB 2260:GOSUB 650:GOTO 670
VI 1999 REM DRAWING ROUTINES
NS 2000 GRAPHICS 0:POKE 752,1:POKE 756,GT:POKE 712,44:POKE 710,44:POKE 709,2:POKE 16,112:POKE 53774,112
TP 2005 POSITION 20,6:? "▮▮▮▮▮▮▮▮▮▮▮▮▮":POSITION 20,7:? "▮           ▮":POSITION 20,8:? "▮           ▮"
XS 2010 POSITION 20,9:? "▮ ▮▮▮▮▮▮▮▮ ▮":FOR Q=10 TO 12:POSITION 20,Q:? "▮ ▮      ▮ ▮":NEXT Q
GV 2020 POSITION 20,13:? "▮ ▮▮▮▮▮▮▮▮ ▮":POSITION 20,14:? "▮           ▮":POSITION 20,15:? "▮           ▮"
ZS 2030 POSITION 20,16:? "▮▮▮▮▮▮▮▮▮▮▮▮▮":POKE 82,0:RETURN
WW 2035 POSITION 21,7:? "▮▮▮▮▮▮▮▮▮▮▮":POSITION 21,8:? "▮▮▮▮▮▮▮▮▮▮▮":RETURN
WN 2040 POSITION 21,14:? "▮▮▮▮▮▮▮▮▮▮▮":POSITION 21,15:? "▮▮▮▮▮▮▮▮▮▮▮":RETURN
HH 2050 POSITION 31,7:? "▮▮▮▮":POSITION 34,6:? "▮▮":POSITION 34,5:? "▮▮"
```

```
QN 2060 POSITION 9,4:? "┌───────────────────────────────┐"
AE 2070 FOR Q=3 TO 1 STEP -1:POSITION 9,Q
   :? "│":POSITION 38,Q:? "│":NEXT Q
TC 2080 POSITION 9,0:? "┌───────────────────────────────┐":RETURN
MM 2100 FOR Q=1 TO 3:POSITION 10,Q:? "▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚":NEXT Q:RETU
   RN
RP 2120 POSITION 31,15:? "┌──┐":POSITION
   34,16:? "│":POSITION 34,17:? "│"
UK 2130 POSITION 9,18:? "┌───────────────────────────────┐":FOR Q=19 TO 21:POSITIO
   N 9,Q:? "│":POSITION 38,Q:? "│"
OI 2140 NEXT Q:POSITION 9,22:? "└───────────────────────────────┘":RETURN
MG 2160 FOR Q=19 TO 21:POSITION 10,Q:? "▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚":NEXT Q:RE
   TURN
CG 2180 POSITION 31,7:? "┌──┐":POSITION 3
   4,6:? "│"
RP 2190 POSITION 9,5:? "┌───────────────────────────────┐"
ZZ 2200 FOR Q=4 TO 1 STEP -1:POSITION 9,Q
   :? "│":POSITION 38,Q:? "│":NEXT Q
SL 2210 POSITION 9,0:? "┌───────────────────────────────┐":RETURN
NL 2220 FOR Q=1 TO 4:POSITION 10,Q:? "▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚▚":NEXT Q:RETU
   RN
PZ 2230 FOR E=1 TO 3:POSITION 10,E:? "
                              ":NEXT E:RETU
   RN
NY 2240 FOR E=19 TO 21:POSITION 10,E:? "
                              ":NEXT E:RE
   TURN
QW 2250 FOR E=1 TO 4:POSITION 10,E:? "
                              ":NEXT E:RETU
   RN
XT 2260 FOR E=6 TO 16:POSITION 0,E:? "
                    ":NEXT E:RETURN
AY 2270 FOR E=0 TO 4:POSITION 0,E:? "
        ":NEXT E:RETURN
ZR 2280 FOR E=18 TO 21:POSITION 0,E:? "
        ":NEXT E:RETURN
UP 2290 POSITION 15,17:? "             ":RETU
   RN
GE 2300 POSITION 8,14:? "Enter your FIRST
   prompt"
VM 2310 POSITION 14,16:? "┌───────────┐":?
   "│           │":? "└───────────┘"
UJ 2320 POSITION 5,21:? "Press RETURN aft
   er each entry":POKE 752,0:RETURN
HL 2330 POSITION 16,6:? "CHOOSE":POSITI
   ON 3,8:? "1 3-LINE    2 4-LINE    3 SETU
   P MENU":RETURN
SX 2340 POSITION 1,12:? "INPUT ───────────────────────────────"
WE 2345 IF FL-48=1 THEN POSITION 9,16
XK 2350 IF FL-48=2 THEN POSITION 9,17
XM 2355 ? "────────────────────────────────────────
   ":POSITION 1,13:? "Line #1":POKE 752,0
   :RETURN
QF 2360 POSITION 1,14:? "Line #2":RETURN
SU 2365 POSITION 1,15:? "Line #3":RETURN
TY 2370 POSITION 1,16:? "Line #4":RETURN
OA 2400 POSITION 19,14:? "SECOND prompt":
   RETURN
WV 2410 POSITION 19,14:? "THIRD prompt ":
   RETURN
RX 2420 POSITION 19,14:? "FOURTH prompt":
   RETURN
UF 2490 REM SHOW LABEL
ML 2500 POKE 82,10:IF LABEL=1 OR LABEL=2
   THEN GOSUB 2230:GOSUB 2240:FOR J=1 TO
   20:NEXT J
JX 2510 IF LABEL=4 THEN GOSUB 2250:FOR J=
   1 TO 30:NEXT J
VM 2520 POSITION 10,1:? ULBL1$:? ULBL2$:?
   ULBL3$
DW 2530 IF LABEL=4 THEN ? ULBL4$
UM 2540 IF LABEL=2 THEN POSITION 10,19:?
   LLBL1$:? LLBL2$:? LLBL3$
RP 2550 POKE 82,0:GOTO 5190
VH 4999 REM INPUT BLANK LABEL
PD 5000 TRAP 40000:POKE 82,0:POSITION 8,1
   0:? "BLANK"
RG 5002 IF LPOS=19 THEN GOTO 5200
WT 5004 IF LABEL=1 OR LABEL=2 THEN GOSUB
   2230
PQ 5007 IF LABEL=4 THEN GOSUB 2250
IY 5010 GOSUB 2270:POKE 752,0:POSITION 1,
   0:? "INPUT"
UC 5020 IF LABEL=1 OR LABEL=2 THEN POSITI
   ON 0,LPOS:? PROMPT1$
DI 5030 IF LABEL=4 THEN POSITION 0,LPOS:?
   FOUR1$
XN 5040 TRAP 8000:POSITION 9,LPOS:INPUT U
   LBL1$
ZQ 5060 IF LABEL=1 OR LABEL=2 THEN ? PROM
   PT2$
QE 5070 IF LABEL=4 THEN ? FOUR2$
RI 5080 POSITION 9,LPOS+1:INPUT ULBL2$
AP 5100 IF LABEL=1 OR LABEL=2 THEN ? PROM
   PT3$
QQ 5110 IF LABEL=4 THEN ? FOUR3$
SW 5120 POSITION 9,LPOS+2:INPUT ULBL3$
SB 5140 IF LABEL=4 THEN ? FOUR4$
KE 5150 IF LABEL=4 THEN POSITION 9,LPOS+3
   :INPUT ULBL4$
DX 5170 POKE 752,1:GOSUB 2270
XF 5180 IF LABEL=1 OR LABEL=2 THEN GOSUB
   2050
SR 5185 IF LABEL=4 THEN GOSUB 2180
UF 5190 IF LABEL=1 OR LABEL=4 THEN GOTO 1
   50
DL 5195 IF LABEL=2 THEN GOTO 210
EA 5199 REM INPUT BLANK LOWER LABEL
AY 5200 TRAP 40000:POKE 82,0
QP 5210 GOSUB 2280:GOSUB 2240:POKE 752,0:
   POSITION 1,18:? "INPUT "
IB 5220 TRAP 8000:POSITION 0,LPOS:? PROMP
   T1$:POSITION 9,LPOS:INPUT LLBL1$
BZ 5240 ? PROMPT2$:POSITION 9,LPOS+1:INPU
   T LLBL2$
FT 5260 ? PROMPT3$:POSITION 9,LPOS+2:INPU
   T LLBL3$
LS 5280 POKE 752,1:GOSUB 2280:GOSUB 2120
OY 5290 GOTO 210
JZ 5370 REM FIXED LABEL
LN 5380 POKE 82,10:POKE 752,1:POSITION 8,
   12:? "FIXED"
ZX 5390 IF LABEL=4 THEN GOSUB 2250:FOR Q=
   1 TO 50:NEXT Q:ULBL1$=FIXF1$:ULBL2$=FI
   XF2$:ULBL3$=FIXF3$:ULBL4$=FIXF4$
AM 5400 IF LABEL=4 THEN POSITION 10,LPOS:
   ? FIXF1$:? FIXF2$:? FIXF3$:? FIXF4$:GO
   TO 5440
VG 5410 IF LPOS=1 THEN GOSUB 2230:FOR Q=1
    TO 40:NEXT Q:ULBL1$=FIX1$:ULBL2$=FIX2
   $:ULBL3$=FIX3$
NX 5420 IF LPOS=19 THEN GOSUB 2240:FOR Q=
   1 TO 40:NEXT Q:LLBL1$=FIX1$:LLBL2$=FIX
   2$:LLBL3$=FIX3$
DD 5430 IF LABEL=1 OR LABEL=2 THEN POSITI
   ON 10,LPOS:? FIX1$:? FIX2$:? FIX3$
NF 5440 FOR Q=1 TO 150:NEXT Q:POKE 82,0
UG 5450 GOTO 5190
OH 5550 REM FORM LABEL
NP 5560 POKE 82,2:POSITION 8,14:? "FORM":
   FOR J=1 TO 75:NEXT J:GOSUB 2260
EO 5570 POSITION 2,8:? "Use CTRL ";CHR$(2
   7);CHR$(159);" or ";CHR$(27);CHR$(158)
   :? "keys to position"
ES 5580 ? "cursor on line":? :? "Press RE
   TURN key":? "after each line":POKE 82,
   10
CF 5590 IF LPOS=19 THEN GOTO 5740
WP 5600 IF LABEL=1 OR LABEL=2 THEN GOSUB
   2230
PD 5610 IF LABEL=4 THEN GOSUB 2250
FU 5620 GOSUB 2270:POSITION 1,0:? "INPUT
   ":POKE 752,0:TRAP 8000
NY 5630 IF LABEL=1 OR LABEL=2 THEN POSITI
   ON 10,LPOS:? FRM1$:? FRM2$:? FRM3$
YZ 5640 IF LABEL=4 THEN POSITION 10,LPOS:
   ? FRM41$:? FRM42$:? FRM43$:? FRM44$
TB 5650 POKE 82,0:IF LABEL=1 OR LABEL=2 T
   HEN POSITION 0,LPOS:? FPMT1$:POSITION
   9,LPOS:INPUT ULBL1$
GY 5660 IF LABEL=4 THEN POSITION 0,LPOS:?
    F4PMT1$:POSITION 9,LPOS:INPUT ULBL1$
MK 5670 IF LABEL=1 OR LABEL=2 THEN POSITI
   ON 0,LPOS+1:? FPMT2$:POSITION 9,LPOS+1
   :INPUT ULBL2$
VN 5680 IF LABEL=4 THEN POSITION 0,LPOS+1
   :? F4PMT2$:POSITION 9,LPOS+1:INPUT ULB
   L2$
XA 5690 IF LABEL=1 OR LABEL=2 THEN POSITI
   ON 0,LPOS+2:? FPMT3$:POSITION 9,LPOS+2
   :INPUT ULBL3$
DM 5700 IF LABEL=4 THEN POSITION 0,LPOS+2
   :? F4PMT3$:POSITION 9,LPOS+2:INPUT ULB
   L3$
MK 5710 IF LABEL=4 THEN POSITION 0,LPOS+3
   :? F4PMT4$:POSITION 9,LPOS+3:INPUT ULB
   L4$
RI 5720 POKE 752,1:GOSUB 2270:GOSUB 2260
TT 5730 GOTO 5180
BS 5740 TRAP 40000:GOSUB 2280:GOSUB 2240:
```

```
   POSITION 10,LPOS:? FRM1$:? FRM2$:? FRM
   3$:POKE 82,0
PH 5750 TRAP 8000:POSITION 1,18:? "INPUT
   ":POKE 752,0:POSITION 0,LPOS:? FPMT1$
   :POSITION 9,LPOS:INPUT LLBL1$
TT 5760 POSITION 0,LPOS+1:? FPMT2$:POSITI
   ON 9,LPOS+1:INPUT LLBL2$
AC 5770 POSITION 0,LPOS+2:? FPMT3$:POSITI
   ON 9,LPOS+2:INPUT LLBL3$
UM 5780 POKE 752,1:GOSUB 2280:GOSUB 2120:
   GOSUB 2260:GOTO 210
NH 5999 REM LABEL SETUP
HB 6000 GRAPHICS 1:DL=PEEK(560)+256*PEEK(
   561):POKE DL+6,7:POKE 709,198:POKE 710
   ,96:POKE 711,68:POKE 712,96
NL 6005 POKE 756,GT:GOSUB 130
AP 6010 POSITION 5,1:? #6;"SETUP MENU"
QT 6020 POSITION 2,4:? #6;"1 summary":POS
   ITION 2,6:? #6;"2 custom prompts":POSI
   TION 2,8:? #6;"3 fixed label"
OD 6030 POSITION 2,10:? #6;"4 custom form
   ":POSITION 2,12:? #6;"5 save to disk":
   POSITION 2,14:? #6;"6 main menu"
OY 6040 ? "           CHOOSE TOPIC BY NUMBER
   "
CW 6050 CHC=PEEK(764):GET #1,CHC:TRAP 605
   0:IF CHC=255 THEN 6050
KH 6060 IF CHC-48>6 OR CHC-48<1 THEN 6050
NP 6070 ON CHC-48 GOTO 6100,6250,6540,680
   0,7850,40
CY 6100 GRAPHICS 0:POKE 82,12:POKE 709,10
   :POKE 710,176:POKE 712,176:POKE 752,1:
   POKE 756,GT
RG 6110 ? "":POSITION 12,0:? "
   ":? "CUSTOM PROMPTS":? "
   "
SM 6120 POSITION 3,4:? "3-LINE BLANK
   3-LINE FORM":POSITION 3,12:? "4
   -LINE BLANK4-LINE FORM"
QX 6130 POSITION 7,21:? "Press ANY KEY to
    continue":POKE 82,6:POSITION 6,6:? PR
   OMPT1$:? PROMPT2$:? PROMPT3$
TG 6140 POSITION 6,14:? FOUR1$:? FOUR2$:?
    FOUR3$:? FOUR4$:POKE 82,24:POSITION 2
   4,6:? FPMT1$:? FPMT2$:? FPMT3$
WM 6150 POSITION 24,14:? F4PMT1$:? F4PMT2
   $:? F4PMT3$:? F4PMT4$:CLOSE #1:OPEN #1
   ,4,0,"K:":GET #1,K:CLOSE #1
LG 6160 POKE 82,12:? "":POSITION 12,0:?
   "":? "CUSTOM LABELS":
   ? ""
VO 6170 POSITION 5,3:? "3-LINE F
   IXED":POSITION 5,7:? "
   4-LINE FIXED"
QL 6180 POSITION 5,12:? "3-LINE
   FORM":POSITION 5,16:? "
   4-LINE FORM"
ZU 6190 POSITION 5,21:? "
   ":FOR Q=4 TO 20:POSITION
    5,Q:? "":POSITION 34,Q:? "":NEXT Q
RR 6200 POSITION 6,22:? "Press ANY KEY fo
   r SETUP MENU":POKE 82,6:POSITION 6,4:?
    FIX1$:? FIX2$:? FIX3$
SB 6210 POSITION 6,8:? FIXF1$:? FIXF2$:?
   FIXF3$:? FIXF4$:POSITION 6,13:? FRM1$:
   ? FRM2$:? FRM3$
OD 6220 POSITION 6,17:? FRM41$:? FRM42$:?
    FRM43$:? FRM44$:CLOSE #1:OPEN #1,4,0,
   "K":GET #1,K:CLOSE #1
JH 6230 POKE 82,0:GOTO 6000
BP 6240 REM CUSTOM PROMPTS
VU 6250 GRAPHICS 0:POKE 82,13:POKE 709,8:
   POKE 710,32:POKE 712,32:POKE 752,1:POK
   E 756,GT:GOSUB 130
OD 6260 ? "":POSITION 4,1:? " CU
   STOM PROMPTS ":POSITION 6,4:?
   "Select Label-type by Number"
CL 6270 POSITION 13,7:? "1 3-LINE BLANK":
   ? "2 3-LINE FORM":? "3 4-LINE BLANK":?
    "4 4-LINE FORM":? "5 SETUP  MENU"
HI 6280 POKE 82,14:CPR=PEEK(764):GET #1,C
   PR:TRAP 6280:IF CPR=255 THEN 6280
UR 6290 IF CPR-48>5 OR CPR-48<1 THEN 6280
RS 6300 ON CPR-48 GOTO 6310,6330,6350,638
   0,6410
SO 6310 POSITION 15,7:? "3-LINE BLANK":GO
   SUB 2300:POSITION 14,17:INPUT PROMPT1$
   :GOSUB 2290:GOSUB 2400
PF 6320 POSITION 14,17:INPUT PROMPT2$:GOS
   UB 2290:GOSUB 2410:POSITION 14,17:INPU
   T PROMPT3$:GOTO 6250
BI 6330 POSITION 15,8:? "3-LINE FORM":GOS
   UB 2300:POSITION 14,17:INPUT FPMT1$:GO
   SUB 2290:GOSUB 2400
AX 6340 POSITION 14,17:INPUT FPMT2$:GOSUB
    2290:GOSUB 2410:POSITION 14,17:INPUT
   FPMT3$:GOTO 6250
MS 6350 POSITION 15,9:? "4-LINE BLANK":GO
   SUB 2300:POSITION 14,17:INPUT FOUR1$:G
   OSUB 2290:GOSUB 2400:POSITION 14,17
JJ 6360 INPUT FOUR2$:GOSUB 2290:GOSUB 241
   0:POSITION 14,17:INPUT FOUR3$:GOSUB 22
   90:GOSUB 2420
DX 6370 POSITION 14,17:INPUT FOUR4$:GOTO
   6250
SQ 6380 POSITION 15,10:? "4-LINE FORM":GO
   SUB 2300:POSITION 14,17:INPUT F4PMT1$:
   GOSUB 2290:GOSUB 2400:POSITION 14,17
LL 6390 INPUT F4PMT2$:GOSUB 2290:GOSUB 24
   10:POSITION 14,17:INPUT F4PMT3$:GOSUB
   2290:GOSUB 2420
LR 6400 POSITION 14,17:INPUT F4PMT4$:GOTO
    6250
CC 6410 ? "":POKE 82,2:POSITION 2,2:POKE
    709,0
WK 6420 ? 30;" PROMPT1$=";CHR$(34);PROMPT
   1$;CHR$(34);":";"PROMPT2$=";CHR$(34);P
   ROMPT2$;CHR$(34)
NT 6430 ? 31;" PROMPT3$=";CHR$(34);PROMPT
   3$;CHR$(34)
GW 6440 ? 32;" FPMT1$=";CHR$(34);FPMT1$;C
   HR$(34);":";"FPMT2$=";CHR$(34);FPMT2$;
   CHR$(34)
FD 6450 ? 33;" FPMT3$=";CHR$(34);FPMT3$;C
   HR$(34)
PC 6460 ? 34;" FOUR1$=";CHR$(34);FOUR1$;C
   HR$(34);":";"FOUR2$=";CHR$(34);FOUR2$;
   CHR$(34)
DO 6470 ? 35;" FOUR3$=";CHR$(34);FOUR3$;C
   HR$(34);":";"FOUR4$=";CHR$(34);FOUR4$;
   CHR$(34)
LX 6480 ? 36;" F4PMT1$=";CHR$(34);F4PMT1$
   ;CHR$(34);":";"F4PMT2$=";CHR$(34);F4PM
   T2$;CHR$(34)
BD 6490 ? 37;" F4PMT3$=";CHR$(34);F4PMT3$
   ;CHR$(34);":";"F4PMT4$=";CHR$(34);F4PM
   T4$;CHR$(34)
KH 6500 ? "CONT":POSITION 0,0
QO 6510 POKE 842,13:STOP
TD 6520 POKE 842,12:POKE 82,0:GOTO 6000
SW 6530 REM CUSTOM FIXED LABEL
AL 6540 GRAPHICS 0:POKE 710,162:POKE 712,
   162:POKE 752,1:POKE 756,GT:POKE 82,13
QM 6550 POSITION 13,1:? "":
   ? "FIXED LABELS":? "":
   POKE 82,2
NA 6560 GOSUB 2330:GOSUB 130
LV 6570 FL=PEEK(764):GET #1,FL:TRAP 6560:
   IF FL=255 THEN 6570
GX 6580 IF FL-48<1 OR FL-48>3 THEN 6560
TM 6590 ON FL-48 GOTO 6600,6630,6670
RX 6600 POSITION 5,8:? "3-LINE":TRAP 6540
   :GOSUB 2340:POSITION 9,13:INPUT FIX1$
MX 6610 GOSUB 2360:POSITION 9,14:INPUT FI
   X2$:GOSUB 2365:POSITION 9,15:INPUT FIX
   3$
TW 6620 GOTO 6540
HE 6630 POSITION 16,8:? "4-LINE":GOSUB 23
   40:POSITION 9,13:INPUT FIXF1$
EY 6640 GOSUB 2360:POSITION 9,14:INPUT FI
   XF2$
KQ 6650 GOSUB 2365:POSITION 9,15:INPUT FI
   XF3$
LC 6660 GOSUB 2370:POSITION 9,16:INPUT FI
   XF4$
VC 6665 GOTO 6540
SW 6670 ? "":POSITION 2,2:POKE 709,2
ZU 6680 ? 15;" FIX1$=";CHR$(34);FIX1$;CHR
   $(34)
ZH 6690 ? 16;" FIX2$=";CHR$(34);FIX2$;CHR
   $(34):? 17;" FIX3$=";CHR$(34);FIX3$;CH
   R$(34)
LT 6700 ? 18;" FIXF1$=";CHR$(34);FIXF1$;C
   HR$(34):? 19;" FIXF2$=";CHR$(34);FIXF2
   $;CHR$(34)
KF 6710 ? 20;" FIXF3$=";CHR$(34);FIXF3$;C
   HR$(34):? 21;" FIXF4$=";CHR$(34);FIXF4
   $;CHR$(34)
KR 6720 ? "CONT":POSITION 0,0
QY 6730 POKE 842,13:STOP
TN 6740 POKE 842,12:POKE 82,0:GOTO 6000
HY 6790 REM CUSTOM FORM LABEL
```

```
QF 6800 GRAPHICS 0:POKE 710,112:POKE 712,
   112:POKE 752,1:POKE 756,GT:POKE 82,14
QG 6810 POSITION 14,1:? "┌──────────┐":?
   "│FORM LABEL│":? "└──────────┘":POKE 8
   2,2
MU 6820 GOSUB 2330:GOSUB 130
HV 6830 FL=PEEK(764):GET #1,FL:TRAP 6820:
   IF FL=255 THEN 6830
FF 6840 IF FL-48<1 OR FL-48>3 THEN 6820
AY 6850 ON FL-48 GOTO 6860,6900,6950
LG 6860 POSITION 5,8:? "3-LINE":TRAP 6800
   :GOSUB 2340:POSITION 9,13:INPUT FRM1$
VC 6870 GOSUB 2360:POSITION 9,14:INPUT FR
   M2$
AT 6880 GOSUB 2365:POSITION 9,15:INPUT FR
   M3$
UF 6890 GOTO 6800
IU 6900 POSITION 16,8:? "4-LINE":GOSUB 23
   40:POSITION 9,13:INPUT FRM41$
ZU 6910 GOSUB 2360:POSITION 9,14:INPUT FR
   M42$
FM 6920 GOSUB 2365:POSITION 9,15:INPUT FR
   M43$
FY 6930 GOSUB 2370:POSITION 9,16:INPUT FR
   M44$
TS 6940 GOTO 6800
QG 6950 ? "K":POSITION 2,2:POKE 709,0
UT 6960 ? 22;" FRM1$=";CHR$(34);FRM1$;CHR
   $(34)
GF 6970 ? 23;" FRM2$=";CHR$(34);FRM2$;CHR
   $(34):? 24;" FRM3$=";CHR$(34);FRM3$;CH
   R$(34)
XD 6980 ? 25;" FRM41$=";CHR$(34);FRM41$;C
   HR$(34):? 26;" FRM42$=";CHR$(34);FRM42
   $;CHR$(34)
QC 6990 ? 27;" FRM43$=";CHR$(34);FRM43$;C
   HR$(34):? 28;" FRM44$=";CHR$(34);FRM44
   $;CHR$(34)
JY 7000 ? "CONT":POSITION 0,0
QF 7010 POKE 842,13:STOP
SU 7020 POKE 842,12:POKE 82,0:GOTO 6000
ZH 7099 REM PRINT LABEL
BM 7100 TRAP 7100:POKE 82,2:GOSUB 2260:GO
   SUB 830
VL 7110 POSITION 2,7:? "TURN ON PRINTER":
   POSITION 14,10:? "  "
KE 7120 POSITION 2,9:? "How many LABELS":
   ? "do you want":POSITION 13,10:INPUT L
   NUM$:LNUM=VAL(LNUM$)
ZF 7130 IF LNUM<1 THEN 7110
HR 7140 POSITION 4,13:? " PRINTING "
PQ 7150 FOR TNUM=1 TO LNUM
MJ 7160 LPRINT CHR$(27);CHR$(15);CHR$(27)
   ;CHR$(83);CHR$(0);CHR$(27);CHR$(65);CH
   R$(6);ULBL1$
QH 7170 LPRINT ULBL2$:LPRINT ULBL3$
MY 7180 IF LABEL=4 THEN LPRINT ULBL4$:GOT
   O 7230
OB 7190 IF LABEL=1 THEN GOTO 7220
CG 7200 LPRINT :LPRINT :LPRINT
PR 7210 LPRINT LLBL1$:LPRINT LLBL2$:LPRIN
   T LLBL3$
GW 7220 IF LABEL=1 OR LABEL=2 THEN LPRINT
   :LPRINT :LPRINT
QR 7230 IF LABEL=4 THEN LPRINT :LPRINT
NP 7240 NEXT TNUM:GOSUB 2260
XQ 7250 IF LABEL=1 OR LABEL=4 THEN 150
WT 7260 IF LABEL=2 THEN 210
QL 7500 REM TITLE PAGE
RZ 7510 MT=PEEK(106):GT=MT-8:GRAPHICS 0:P
   OKE 106,GT
CL 7520 DL=PEEK(560)+256*PEEK(561):POKE D
   L+6,7:POKE 710,0:POKE 709,200:POKE 752
   ,1
YZ 7530 POSITION 4,1:? "PHOTOGRAPHIC":POK
   E DL+7,10
JJ 7540 FOR Q=12 TO 20 STEP 4
ZQ 7550 POKE 82,Q:POSITION Q,Q-10:? "┌───
   ────┐":? "│        │":? "│┌──────┐│":? "
   ││      ││":? "││      ││"
GQ 7560 ? "│└──────┘│":? "│        │":? "└─
   ───────┘"
ZI 7570 GOSUB 800
JN 7580 NEXT Q
PX 7590 POSITION 13,3:? A$:GOSUB 820:GOSU
   B 800:POSITION 17,7:? A$:GOSUB 820:GOS
   UB 800:X=1
LP 7600 POSITION 20+X,11:? A$(X,X);:GOSUB
    820
TX 7610 IF X>7 THEN X=1:GOTO 7630
SU 7620 GOTO 7600
UA 7630 POSITION 20+X,16:? B$(X,X);:GOSUB
    820:IF X>7 THEN 7650
UN 7640 GOTO 7630
SH 7650 GOSUB 800:POSITION 9,14:? "by":PO
   SITION 4,16:? "Gary Coppola"
EK 7660 FOR Z=1536 TO 1554:READ H:POKE Z,
   H:NEXT Z
ZF 7670 POSITION 10,21:? "Press START To
   Begin"
DV 7680 POSITION 4,1:? "Photo":U=USR(1536
   )
KH 7690 DATA 104,173,31,208,201,6,240,10,
   232,142,10,212,142,25,208,76,1,6,96
BM 7700 IF PEEK(53279)=6 THEN 10020
FA 7800 POSITION 25,18:? "  Verification:
   QUIT?(Y/N)      ":GOSUB 830:GOSUB 130
AP 7810 TRAP 7800:GET #1,G:IF G=89 OR G=1
   21 THEN POKE 82,2:GRAPHICS 0:END
NW 7820 IF G=78 OR G=110 THEN 40
UM 7830 GOTO 7810
GN 7850 ? "  Verification:SAVE TO DISK?(
   Y/N)":GOSUB 830:GOSUB 130
RJ 7860 TRAP 8050:GET #1,G:IF G=89 OR G=1
   21 THEN SAVE "D:PHOTOLBL.BAS":GOTO 600
   0
ZF 7870 IF G=78 OR G=110 THEN 6000
XO 7880 GOTO 7860
CG 8000 POKE 712,66:POKE 752,1:POKE 82,3:
   FOR J=1 TO 3
LQ 8005 FOR Q=14 TO 0 STEP -1:SOUND 0,150
   +Q,10,Q:NEXT Q:NEXT J:GOSUB 2260
VF 8010 POSITION 3,8:? " ERROR #";PEEK(19
   5):? "HAS OCCURRED":? :? "RETURNING TO
   ":? " MAIN MENU"
IQ 8020 FOR Q=1 TO 130:NEXT Q:TRAP 40000
QP 8030 GOTO 40
JD 8050 TRAP 40000:? "              DISK SAV
   E - ABORTED":? "              ERROR # "
   ;PEEK(195)
PS 8060 FOR J=1 TO 140:NEXT J:GOTO 6000
QT 10000 REM REDEFINE CHARACTERS
DX 10020 CHSET=GT*256:POSITION 5,21:? "IN
   ITIALIZING, PLEASE WAIT..."
BR 10030 POKE 204,GT:POKE 206,224:MOVE$="
   h  1MrKHPyfNfLJPR ":U=USR(ADR(MOVE$)
   )
TM 10040 POKE 756,GT:FOR J=1 TO 9:READ OC
TO 10050 FOR B=0 TO 7:READ I:POKE CHSET+O
   C+B,I
WA 10060 NEXT B:NEXT J:GOTO 15
TC 10070 DATA 512,255,255,192,192,192,192
   ,192,192
CO 10080 DATA 576,0,0,0,0,170,170,170,170
QH 10090 DATA 584,255,255,3,3,3,3,3,3
PJ 10100 DATA 592,85,85,85,85,85,85,85,85
SS 10110 DATA 600,3,3,3,3,3,3,255,255
VQ 10120 DATA 608,192,192,192,192,192,192
   ,255,255
HZ 10130 DATA 632,24,24,0,255,255,0,24,24
GS 10140 DATA 640,170,170,170,170,170,170
   ,170,170
TF 10150 DATA 672,85,85,85,85,0,0,0,0
```

LISTING 2

```
MX 10 REM PHOTO LABELMAKER, LISTING 2
AI 20 REM BY GARY COPPOLA
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "KDisk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
```

```
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
LQ 1000 DATA 78
RV 1010 DATA 049048048051048032080079075069032050048052044071084058080079075069032050048054044050052058
JY 1020 DATA 077079086069036061034041620041600001772051452032002082492302062302042022082420960340580850061
PK 1030 DATA 0850830820400650680820400770790860690360410411155
```

CAVERNS OF THE MINOTAUR

COLLECT GOLD AND DIAMONDS WHILE AVOIDING THE DREADED MAN-BULL

Article on page 31

LISTING 1

Don't type the TYPO II Codes!

```
LV 0 REM CAVERNS OF THE MINOTAUR
VQ 1 REM BY RUFUS REYNOLDS
LA 2 REM (c)1990, ANTIC PUBLISHING INC.
AW 3 CLR :DIM P1$(20):A=PEEK(106)-8:NCB=A
   *256:POKE 204,A:POKE 206,224
CS 4 FOR X=1 TO 20:READ B:P1$(X,X)=CHR$(B
   ):NEXT X
RE 5 DATA 104,162,4,160,0,177,205,145,203
   ,200,208,249,230,206,230,204,202,208,2
   42,96
WE 6 Q=USR(ADR(P1$))
BQ 7 DLIST=PEEK(560)+PEEK(561)*256
RG 8 MAZE=1:LI=2:SKILL=1
WE 10 DATA 0,0,224,191,165,229,0,0,56,56,
   16,56,84,16,40,108,60,126,195,223,209,
   219,66,60,0,24,60,126,126,60,24,0
SJ 20 DATA 0,0,0,15,19,27,3,7,0,0,0,240,2
   00,216,192,224,60,24,255,255,189,189,3
   6,102
YH 30 DATA 187,187,187,0,238,238,238,0
IU 35 RESTORE 10
SP 40 FOR D=NCB+1*8 TO NCB+9*8-1:READ E:P
   OKE D,E:NEXT D
MX 50 GOSUB 30000
ZV 55 GRAPHICS 1+16:POKE 756,A
YS 60 IF MAZE=1 THEN RESTORE 90
XC 65 IF MAZE=2 THEN RESTORE 140
DR 70 READ GR1,GR2,GR3,GR4:IF GR1=-1 THEN
    190
OW 80 COLOR 136:PLOT GR1,GR2:DRAWTO GR3,G
   R4:GOTO 70
TK 90 DATA 0,0,19,0,0,1,8,1,11,1,19,1,0,2
   ,0,10,19,0,19,10,0,12,0,22,19,12,19,22
   ,0,23,19,23
OX 100 DATA 3,3,6,3,9,3,10,3,13,3,16,3,2,
   4,3,4,8,4,11,4,16,4,17,4,8,5,11,5,4,6,
   4,6,9,6,10,6,15,6,15,6
KW 110 DATA 3,7,5,7,14,7,16,7,4,8,4,8,15,
   8,15,8,8,10,11,10,8,11,8,14,11,11,11,1
   4
AE 120 DATA 4,16,4,16,15,16,15,16,3,17,5,
   17,14,17,16,17,4,18,4,18,9,18,10,18,15
   ,18,15,18,8,19,11,19
NC 130 DATA 2,20,3,20,8,20,11,20,16,20,17
   ,20,3,21,6,21,13,21,16,21,9,21,10,21,-
   1,-1,-1,-1
KF 140 DATA 0,0,0,23,19,0,19,23,1,0,18,0,
   1,23,18,23
KO 150 DATA 4,3,6,5,6,3,4,5,8,3,11,3,8,4,
   8,6,11,4,11,6,13,3,15,5,13,5,15,3,9,8,
   10,8,8,9,11,9,8,10,11,10
TD 160 DATA 4,10,5,10,9,11,10,11,14,10,15
   ,10,3,11,6,11,13,11,16,11,3,12,6,12,13
   ,12,16,12
NL 170 DATA 4,13,5,13,9,13,10,13,14,13,15
   ,13,8,14,11,14,8,15,11,15,9,16,10,16,4
   ,19,6,21,4,21,6,19
UK 180 DATA 8,18,11,18,8,19,8,21,11,19,11
   ,21,9,21,10,21,13,19,15,21,13,21,15,19
   ,1,1,18,1,-1,-1,-1,-1
PJ 190 COLOR 40:PLOT 0,11:PLOT 19,11
FD 200 IF MAZE=1 THEN EX=9:EY=14:EX1=10
OW 210 IF MAZE=2 THEN EX=9:EY=6:EX1=10
GH 220 COLOR 136:PLOT EX,EY:DRAWTO EX1,EY
OA 230 IF MAZE=1 THEN A1=9:A2=11:A3=10
CK 240 IF MAZE=2 THEN A1=9:A2=4:A3=10
NY 250 COLOR 37:PLOT A1,A2:COLOR 38:PLOT
   A3,A2
DK 260 IF MAZE=1 THEN X=9:Y=1:X1=X:Y1=Y:M
   X=1:MY=11:MX1=MX:MY1=MY
QN 270 IF MAZE=2 THEN X=6:Y=4:X1=X:Y1=Y:M
   X=13:MY=4:MX1=MX:MY1=MY
OZ 280 IF MAZE=1 THEN RESTORE 310
RE 285 IF MAZE=2 THEN RESTORE 320
DS 290 READ G1,G2:IF G1=-1 THEN 330
VI 300 COLOR 35:PLOT G1,G2:GOTO 290
SA 310 DATA 2,3,4,4,17,3,15,4,5,6,3,8,14,
   6,16,8,5,16,3,18,16,16,14,18,2,21,17,2
   1,-1,-1
AD 320 DATA 5,3,5,5,14,3,14,5,8,8,11,11,6
   ,10,3,13,13,10,16,13,11,13,8,16,5,19,5
   ,21,14,19,14,21,-1,-1
UF 330 IF MAZE=1 THEN RESTORE 360
WK 335 IF MAZE=2 THEN RESTORE 370
EM 340 READ D1,D2:IF D1=-1 THEN 380
MQ 350 COLOR 36:PLOT D1,D2:GOTO 340
DO 360 DATA 8,3,11,3,3,6,8,6,11,6,16,6,5,
   8,14,8,3,16,14,16,5,18,8,18,11,18,16,1
   8,4,20,15,20,8,21,11,21,-1,-1
CA 370 DATA 4,4,15,4,11,8,3,10,8,11,16,10
   ,6,13,8,13,13,13,11,16,4,20,15,20,-1,-
   1
EX 380 COLOR 2:PLOT X,Y:COLOR 167:PLOT MX
   ,MY
DU 390 POSITION 1,0:? #6;SC
PR 395 IF SC>=1000000 THEN GOTO 29000
XX 400 IF LI=2 THEN COLOR 2:PLOT 14,0:DRA
   WTO 15,0
PV 410 IF LI=1 THEN COLOR 2:PLOT 14,0
PS 415 IF LI=-1 THEN 26000
GZ 420 S=STICK(0):T=STRIG(0)
LZ 424 IF SKILL>=13 THEN 430
VG 425 IF DONE=1 THEN DONE=0:GOTO 430
QQ 426 IF DONE=0 THEN DONE=1:GOTO 20000
WG 430 IF X>MX THEN MX=MX+1:GOTO 470
XK 440 IF X<MX THEN MX=MX-1:GOTO 470
YS 450 IF Y>MY THEN MY=MY+1:GOTO 470
IY 460 IF Y<MY THEN MY=MY-1
JT 470 LOCATE MX,MY,HIT
WG 480 IF HIT=40 THEN 20000
WY 490 IF HIT=136 THEN 20000
CG 500 IF HIT=33 OR HIT=1 THEN 20000
AE 510 IF HIT=2 THEN 21000
QE 520 COLOR 0:PLOT MX1,MY1:COLOR 167:PLO
   T MX,MY:MX1=MX:MY1=MY
YI 530 IF S=7 THEN X=X+1:IF X>19 THEN X=1

BK 535 IF S=7 THEN 600
GQ 536 IF PEEK(77)=254 THEN POKE 77,0
AZ 540 IF S=11 THEN X=X-1:IF X<0 THEN X=1
   8
NU 545 IF S=11 THEN 600
VU 550 IF S=14 THEN Y=Y-1:GOTO 600
TV 560 IF S=13 THEN Y=Y+1:GOTO 600
XZ 570 IF T=0 AND KEY=1 AND X=1 AND Y=11
   THEN COLOR 0:PLOT 0,11:PLOT 19,11:GOTO
    420
AQ 575 IF T=0 AND KEY=1 AND X=18 AND Y=11
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   THEN COLOR 0:PLOT 0,11:PLOT 19,11:GOT
   O 420
BG 580 IF T=0 AND KEY1=1 AND MAZE=1 AND X
   =9 AND Y=15 THEN COLOR 0:PLOT 9,14:DRA
   WTO 10,14
PO 585 IF T=0 AND KEY1=1 AND MAZE=1 AND X
   =10 AND Y=15 THEN COLOR 0:PLOT 9,14:DR
   AWTO 10,14
MG 590 IF T=0 AND KEY1=1 AND MAZE=2 AND X
   =9 AND Y=7 THEN COLOR 0:PLOT 9,6:DRAWT
   O 10,6
UU 592 IF T=0 AND KEY1=1 AND MAZE=2 AND X
   =10 AND Y=7 THEN COLOR 0:PLOT 9,6:DRAW
   TO 10,6
OR 595 GOTO 420
AK 600 LOCATE X,Y,HIT
HX 610 IF HIT=33 THEN KEY=1:GOTO 22000
ZY 620 IF HIT=1 THEN KEY1=1:GOTO 22000
KT 630 IF HIT=35 THEN GOLD=GOLD+1:SC=SC+1
   0:GOTO 23000
MU 640 IF HIT=36 THEN GOLD=GOLD+1:SC=SC+2
   0:GOTO 23000
HA 650 IF HIT=37 OR HIT=38 THEN GOTO 2400
   0
ZT 670 IF HIT=167 THEN 21000
ID 680 IF HIT=40 OR HIT=136 THEN X=X1:Y=Y
   1
CB 690 IF GOLD>=14 AND MAZE=1 AND KEY<>1
   THEN COLOR 33:PLOT 18,4
XP 691 IF GOLD>=14 AND MAZE=2 AND KEY<>1
   THEN COLOR 33:PLOT 13,20
QC 692 IF GOLD>14 AND MAZE=1 AND KEY1<>1
   THEN COLOR 1:PLOT 1,4
EJ 693 IF GOLD>14 AND MAZE=2 AND KEY1<>1
   THEN COLOR 1:PLOT 6,20
JC 695 COLOR 0:PLOT X1,Y1:COLOR 2:PLOT X,
   Y:X1=X:Y1=Y:GOTO 420
NM 700 GOTO 420
GR 20000 MX=MX1:MY=MY1
MA 20010 MOVE=INT(4*RND(0)+1)
YX 20020 IF MOVE=1 THEN MX=MX+1:GOTO 2006
   0
BS 20030 IF MOVE=2 THEN MX=MX-1:GOTO 2006
   0
CG 20040 IF MOVE=3 THEN MY=MY+1:GOTO 2006
   0
FB 20050 IF MOVE=4 THEN MY=MY-1:GOTO 2006
   0
UD 20060 LOCATE MX,MY,HIT:IF HIT=40 OR HI
   T=136 THEN MX=MX1:MY=MY1:GOTO 520
CR 20070 IF HIT=2 THEN 21000
UD 20080 GOTO 520
FH 21000 COLOR 0:PLOT MX,MY:PLOT MX1,MY1:
   COLOR 167:PLOT X,Y
DE 21010 COUNT=800:FOR ZZ=20 TO 0 STEP -1
   :SOUND 0,COUNT,10,ZZ:SOUND 1,COUNT+(ZZ
   *99),10,ZZ:COUNT=COUNT-10:NEXT ZZ
TE 21020 SOUND 0,0,0,0:SOUND 1,0,0,0:LI=L
   I-1:GOTO 55
RV 22000 ZZZ=60:FOR ZZ=0 TO 40 STEP -1:SO
   UND 0,ZZ,10,8:SOUND 1,ZZZ,10,8:ZZZ=ZZZ
   -1:NEXT ZZ
EA 22010 COLOR 2:PLOT X,Y:COLOR 0:PLOT X1
   ,Y1:X1=X:Y1=Y
MP 22020 SOUND 0,0,0,0:SOUND 1,0,0,0
WC 22030 GOTO 390
DY 23000 COLOR 2:PLOT X,Y:COLOR 0:PLOT X1
   ,Y1:X1=X:Y1=Y
BX 23010 FOR ZZ=-20 TO 20:SOUND 0,ABS(ZZ)
   ,10,8:NEXT ZZ:SOUND 0,0,0,0:GOTO 390
NE 24000 GOSUB 25000
WT 24001 FOR COUNT=0 TO 5:SETCOLOR 4,8,8
UA 24020 FOR ZZ=1 TO 50:NEXT ZZ
VF 24030 SETCOLOR 4,0,0:FOR ZZ=1 TO 50:NE
   XT ZZ
DN 24040 NEXT COUNT
AJ 24050 SETCOLOR 4,0,0
JE 24060 IF MAZE=1 THEN MAZE=2:GOTO 24080
SJ 24070 IF MAZE=2 THEN MAZE=1
GQ 24080 SC=SC+GOLD
PY 24085 SKILL=SKILL+1
PA 24090 GOLD=0:KEY=0:KEY1=0:GOTO 55
BJ 25000 FOR ZZZ=1 TO 3:FOR ZZ=20 TO 0 ST
   EP -1:SOUND 0,20,10,ZZ:NEXT ZZ:SOUND 0
   ,0,0,0:NEXT ZZZ:RETURN
EU 26000 CLEAR=0
ID 26010 COLOR 0:PLOT CLEAR,0:DRAWTO CLEA
   R,23:CLEAR=CLEAR+1
IS 26020 IF CLEAR=20 THEN 26040
AG 26030 GOTO 26010
NY 26040 FOR S=0 TO 3:SOUND S,0,0,0:NEXT
   S
KG 26060 COLOR 136:PLOT 6,2:DRAWTO 13,2:D
   RAWTO 13,4:DRAWTO 6,4:DRAWTO 6,2
BN 26062 POSITION 3,0:? #6;"YOUR SCORE WA
   S":POSITION 7,3:? #6;SC
XH 26063 POSITION 0,10:? #6;"START TO PLA
   Y AGAIN."
EQ 26064 POSITION 0,6:? #6;"YOU REACHED L
   EVEL ";SKILL
VV 26070 POKE 53279,8
MR 26080 IF PEEK(53279)=6 THEN GOLD=0:KEY
   =0:KEY1=0:LI=2:SC=0:MAZE=1:SKILL=1:GOT
   O 50
EQ 26090 GOTO 26070
PE 30000 GRAPHICS 2:SETCOLOR 2,0,0:POSITI
   ON 3,1:? #6;"CAVERNS OF THE":POSITION
   6,3:? #6;"MINOTAUR"
XA 30005 POKE 752,2
KL 30010 ? "    Made by Rufus H Reynolds
   III":? :? "                START TO BEGIN"
LM 30035 RESTORE 30070
TF 30040 READ C,B:IF C=-1 THEN RESTORE 30
   070:GOTO 30040
SV 30050 SOUND 0,C,10,10:FOR I=1 TO B*0.4
   :NEXT I:SOUND 0,0,0,0
IT 30052 IF PEEK(53279)=6 THEN SOUND 0,0,
   0,0:RETURN
ZM 30060 GOTO 30040
UE 30070 DATA 81,50,60,50,60,100,64,50,64
   ,100,72,50,72,50,81,100,91,50,96,50,96
   ,100,81,50
GD 30080 DATA 60,50,60,100,64,25,64,50,72
   ,50,81,50,81,200,81,50,60,50,60,50,60,
   50,60,50,64,50,64,100
AH 30090 DATA 72,50,72,50,81,50,81,50,96,
   50,108,50,121,50,121,100,72,25,72,25,7
   2,50,72,100
VL 30100 DATA 81,25,81,25,91,100,96,100,1
   08,200,0,100,-1,-1
```

STATWHIZ

ANALYZING NUMERICAL DATA WITH YOUR ATARI

Article on page 23

LISTING 1

Don't type the TYPO II Codes!

```
UD 1 REM STATWHIZ (Ver. 1)
JL 2 REM BY Bernard I. Sparks, III
LB 3 REM (c)1990, ANTIC PUBLISHING INC.
ZH 5 RAD :GOSUB 2650:GOSUB 10:GOTO 30
YR 6 POKE 16,64:POKE 53774,64:RETURN
SD 7 GRAPHICS 16:SETCOLOR 2,7,0:DL=PEEK(5
   60)+PEEK(561)*256:POKE 559,0:POKE DL+3
   ,70:POKE DL+6,6
EP 8 POKE DL+7,2:POKE DL+29,65:POKE DL+30
   ,PEEK(560):POKE DL+31,PEEK(561):POKE 7
   52,1:GOSUB 6:RETURN
OL 9 IF NSG<2 THEN GOSUB 1180:GOTO 140
AS 10 FOR X=1 TO 8:A(X)=0:B(X)=0:TT(X)=0:
   TTS(X)=0:TB(X)=0:TBS(X)=0:T(X)=0:NEXT
   X:T=0:A=0:B=0:C=0:D=0:E=0:F=0:TT=0
IQ 11 R=0:TB=0:TTS=0:TBS=0:TOT=0:RETURN
SN 15 FOR X=1 TO 8:M(X)=0:TOT(X)=0:SSQ(X)
   =0:SD(X)=0:VR(X)=0:HV(X)=-9999999:LV(X
   )=9999999:NEXT X:RETURN
XN 30 GOSUB 2580:GOSUB 6:U=0
LQ 40 GET #2,Q:IF Q<65 OR Q>72 THEN 40
GN 50 IF Q=65 THEN T$="GENERAL STATISTICS
   ":D$="D:GN.SW":AN=700:GOTO 140
OD 60 IF Q=66 THEN T$="  T-TEST (INDPD)":
   D$="D:TI.SW":AN=900:U=2:V=0:GOTO 140
PQ 65 IF Q=67 THEN T$="  T-TEST (DEPND)":
   D$="D:TD.SW":AN=1150:U=2:V=0:GOTO 140
EU 70 IF Q=68 THEN T$="  ONE-WAY ANOVA":D
   $="D:A1.SW":AN=1310:GOTO 140
QM 75 IF Q=69 THEN T$="  TWO-WAY ANOVA":D
   $="D:A2.SW":AN=1550:GOTO 140
UK 80 IF Q=70 THEN T$="     CHI-SQUARE":D$
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   ="D:CH.SW":AN=1800:U=2:V=1:GOTO 140
TM 90 IF Q=71 THEN T$="     CORRELATION":D
   $="D:CR.SW":AN=2100:U=2:V=0:GOTO 140
PZ 120 IF Q=72 THEN D$="D:RG.SW":T$="
   REGRESSION":AN=2200:U=2:GOTO 140
PB 140 GOSUB 250:GOSUB 2620:POKE 559,ANTI
   C:GOSUB 6:O$="S:":HC=0:TOT=0
MY 150 GET #2,Q:IF Q<65 OR Q>69 THEN 150
HS 160 IF Q=65 THEN GOSUB 300:GOTO 140
KB 170 IF Q=66 THEN GOSUB 500:GOTO 140
OJ 180 IF Q=67 THEN GOSUB 630:GOTO 140
HT 190 IF Q=68 THEN GOSUB AN:GOTO 140
BD 195 IF Q=69 THEN GOTO 30
SM 210 GET #2,Q:IF Q=89 THEN GOTO RL1
XL 230 IF Q=78 THEN GOTO RL2
MK 240 GOTO 210
JN 250 GOSUB 7:POSITION 1,0:? T$:RETURN
MI 260 ? CHR$(125):POSITION 1,0:? TS$:GOS
   UB 6:RETURN
VB 295 ? CHR$(125):POSITION 13,10:? "Disk
    Error!":? CHR$(253):POKE 559,ANTIC:FO
   R X=1 TO 400:NEXT X:CLOSE #1:GOTO 140
LY 300 GOSUB 15:TRAP 300:TS$=" CREATE DAT
   ABASE":GOSUB 260:POSITION 5,4:? "Numbe
   r of Sample Groups:";:POKE 559,ANTIC
KT 306 INPUT NSG:IF U=2 AND V=1 THEN 322
BU 308 IF U=2 THEN 314
FP 309 IF U=4 THEN 318
FD 310 IF NSG<1 OR NSG>8 THEN 300
NG 312 GOTO 320
TQ 314 IF NSG<>2 THEN 300
NS 316 GOTO 320
DH 318 IF NSG<2 OR NSG>4 THEN 300
JO 320 YP=6:FOR X=1 TO NSG:POSITION 8,YP:
   ? "Subjects in Group #";:? X;:? ":";:I
   NPUT D
PB 321 GOTO 324
CR 322 IF NSG<2 OR NSG>4 THEN 300
NL 323 GOTO 320
NQ 324 IF U=2 AND V=1 THEN 327
TP 325 IF D<1 OR D>225 THEN 300
OF 326 GOTO 330
MQ 327 IF D<2 OR D>4 THEN 300
KH 330 SUBJ(X)=D:YP=YP+1:NEXT X:POSITION
   7,21:? AO$:RL1=340:RL2=300:GOTO 210
WI 340 FOR X=1 TO NSG:FOR Y=1 TO SUBJ(X)
ZY 350 TRAP 350:GOSUB 260:POSITION 10,8:?
    "GROUP #";:? X
JX 360 POSITION 8,10:? "SUBJECT #";:? Y:P
   OSITION 11,12:? "DATA:";:POKE 559,ANTI
   C:INPUT D:SV(X,Y)=D:TOT(X)=TOT(X)+D
ZI 365 SSQ(X)=SSQ(X)+(D*D):IF D>=HV(X) TH
   EN HV(X)=D
WI 375 IF D<=LV(X) THEN LV(X)=D
KB 380 NEXT Y:M(X)=TOT(X)/SUBJ(X):POSITIO
   N 7,21:? AO$:RL1=395:RL2=390:GOTO 210
BY 390 M(X)=0:TOT(X)=0:SSQ(X)=0:HV(X)=-99
   99999:LV(X)=9999999:FOR Y=1 TO SUBJ(X)
   :GOTO 350
PO 395 NEXT X:LOOP=1:POSITION 7,21:? SD$:
   RL1=410:RL2=600:GOTO 210
EZ 410 OPEN #1,8,0,D$:? #1;NSG:FOR X=1 TO
    NSG:? #1;SUBJ(X):? #1;M(X):? #1;TOT(X
   ):? #1;SSQ(X):? #1;HV(X):? #1;LV(X)
GR 420 NEXT X:FOR X=1 TO NSG:FOR Y=1 TO S
   UBJ(X):? #1;SV(X,Y):NEXT Y:NEXT X:CLOS
   E #1:RETURN
YP 500 TS$=" Modify database":GOSUB 260:G
   OSUB 710
QV 520 TRAP 500:POSITION 6,7:? "Modify wh
   ich group? ";:POKE 559,ANTIC:INPUT Z:I
   F Z<1 OR Z>NSG THEN 500
BP 540 POSITION 6,9:? "Modify which subj.
   ? ";:INPUT W:IF W<1 OR W>SUBJ(Z) THEN
   500
QQ 560 TRAP 560:GOSUB 260:POSITION 10,8:?
    "Subject #:     ";:? W:POSITION 10,10
   :? "Previous Data: ";:? SV(Z,W)
LO 565 POSITION 10,12:? "Modified Data: "
   ;:POKE 559,ANTIC:INPUT X:POSITION 7,21
   :? AO$:RL1=570:RL2=560:GOTO 210
RZ 570 TOT(Z)=TOT(Z)-SV(Z,W):SSQ(Z)=SSQ(Z
   )-(SV(Z,W)*SV(Z,W)):SV(Z,W)=X:TOT(Z)=T
   OT(Z)+X:SSQ(Z)=SSQ(Z)+(X*X)
KG 575 HV(Z)=-9999999:LV(Z)=9999999:FOR X
   =1 TO SUBJ(Z):IF SV(Z,X)>=HV(Z) THEN H
   V(Z)=SV(Z,X)
IB 576 IF SV(Z,X)<=LV(Z) THEN LV(Z)=SV(Z,
   X)
LI 578 NEXT X:M(Z)=TOT(Z)/SUBJ(Z):POSITIO
   N 5,21:? " End Modifying? (Y)es (N)o
   ":RL1=590:RL2=500:LOOP=1:GOTO 210
JF 590 POSITION 6,21:? SD$:RL1=410:RL2=60
   0:GOTO 210
ZC 600 RETURN
PE 630 TRAP 295:GOSUB 10:OPEN #1,4,0,D$:I
   NPUT #1;NSG:FOR X=1 TO NSG:INPUT #1;D:
   SUBJ(X)=D:INPUT #1;D:M(X)=D
YT 640 INPUT #1;D:TOT(X)=D:INPUT #1;D:SSQ
   (X)=D:INPUT #1;D:HV(X)=D:INPUT #1;D:LV
   (X)=D:NEXT X:LOOP=1:FOR X=1 TO NSG
VZ 645 FOR Y=1 TO SUBJ(X):INPUT #1;D:SV(X
   ,Y)=D:NEXT Y:NEXT X:CLOSE #1:RETURN
VJ 700 GOSUB 710:TRAP 700:GOSUB 250:POSIT
   ION 6,4:? "Analyze which sample group:
    ";:POKE 559,ANTIC:INPUT Z:GOTO 720
GZ 710 IF LOOP=0 THEN GOSUB 630
ZU 715 RETURN
SY 720 IF Z<1 OR Z>NSG THEN 700
FD 750 POKE 559,0:FOR X=1 TO SUBJ(Z):T(Z)
   =T(Z)+((SV(Z,X)-M(Z))*(SV(Z,X)-M(Z))):
   NEXT X:VR(Z)=T(Z)/SUBJ(Z)
PP 760 SD(Z)=SQR(VR(Z))
NE 770 OPEN #3,8,0,O$:GOSUB 250
TV 780 POSITION 3,6:? #3;"Sample Group:",
   :? #3;Z:POSITION 3,8:? #3;"Mean:",,:?
   #3;M(Z)
UB 790 POSITION 3,10:? #3;"Variance:",:?
   #3;VR(Z):POSITION 3,12:? #3;"Std. Dev.
   :",:? #3;SD(Z):POSITION 3,14
ML 800 ? #3;"Max. Value:",:? #3;HV(Z):POS
   ITION 3,16:? #3;"Min. Value:",:? #3;LV
   (Z)
PG 810 IF HC=0 THEN CLOSE #3:POSITION 7,2
   1:? HC$:POKE 559,ANTIC:RL1=830:RL2=820
   :GOTO 210
IG 820 CLOSE #3:RETURN
DG 830 LPRINT :O$="P:":HC=1:GOTO 770
LO 900 GOSUB 710:GOSUB 9:POKE 559,0:GOSUB
    990:GOSUB 1060:RETURN
XG 990 SA=SSQ(1)-(TOT(1)*TOT(1))/SUBJ(1):
   SB=SSQ(2)-(TOT(2)*TOT(2))/SUBJ(2)
YK 1000 S2=(SA+SB)/(SUBJ(1)+SUBJ(2)-2):T=
   ABS((M(1)-M(2))/SQR(S2/SUBJ(1)+S2/SUBJ
   (2))):ST=T:DF=SUBJ(1)+SUBJ(2)-2
VM 1021 TRAP 1055:R=ATN(ST/SQR(DF)):RC=CO
   S(R):X=1:R2=RC*RC:RS=SIN(R)
MY 1022 IF DF/2=INT(DF/2) THEN 1040
ZE 1025 IF DF=1 THEN Y=R:GOTO 1050
DI 1030 Y=RC:FOR Z=3 TO (DF-2) STEP 2:X=X
   *R2*(Z-1)/Z:Y=Y+X*RC:NEXT Z:Y=R+RS*Y:G
   OTO 1050
TI 1040 Y=1:FOR Z=2 TO (DF-2) STEP 2:X=X*
   R2*(Z-1)/Z:Y=Y+X:NEXT Z:P=1-Y*RS:RETUR
   N
JN 1050 P=1-Y*0.63661977:RETURN
HF 1055 P=0
TE 1060 TOT=0:TS$="T-Value: "
YI 1065 OPEN #3,8,0,O$:GOSUB 250
FT 1070 IF P=0 THEN POSITION 5,8:? #3;TS$
   ,:? #3;T:POSITION 5,10:? #3;"P-Value:
   ",:? #3;"<.001":GOTO 1072
ML 1071 POSITION 5,8:? #3;TS$,:? #3;T:POS
   ITION 5,10:? #3;"P-Value: ",:? #3;P
KA 1072 IF TOT=1 THEN POSITION 11,14:? "C
   ell count of N<5!":POSITION 3,16:? "Ch
   i-Square may not be appropriate!"
VV 1073 IF TOT=1 THEN ? CHR$(253)
GT 1080 IF HC=0 THEN CLOSE #3:POSITION 7,
   21:? HC$:POKE 559,ANTIC:RL1=1090:RL2=8
   20:GOTO 210
FT 1085 CLOSE #3:RETURN
PB 1090 LPRINT :O$="P:":HC=1:GOTO 1065
JF 1150 POKE 559,0:B=0:C=0:GOSUB 710:GOSU
   B 9
LX 1160 IF SUBJ(1)<>SUBJ(2) THEN GOSUB 11
   80:RETURN
VK 1170 N=SUBJ(1):DF=N-1:GOTO 1190
EF 1180 GOSUB 250:? CHR$(253):POSITION 6,
   8:? "Sample groups are not equal!":POS
   ITION 6,10
SV 1181 ? "The data cannot be analyzed!":
   POKE 559,ANTIC:FOR X=1 TO 250:NEXT X:R
   ETURN
PJ 1190 FOR X=1 TO SUBJ(1):A=SV(1,X)-SV(2
   ,X):B=B+A:C=C+A*A:NEXT X:T=ABS(B/SQR((
   (N*C)-(B*B))/(N-1))):ST=T
IU 1210 GOSUB 1021:GOSUB 1060:RETURN
PV 1310 N=0:T=0:TS=0:B=0:GOSUB 710:GOSUB
   9
FC 1320 POKE 559,0:FOR X=1 TO NSG:N=N+SUB
   J(X):T=T+TOT(X):TS=TS+SSQ(X):NEXT X:A=
```

```
   T*T/N:FOR X=1 TO NSG
PB 1330 B=B+(TOT(X)*TOT(X)/SUBJ(X)):NEXT
   X:C=B-A:D=TS-B:F=((B-A)/(NSG-1))/((TS-
   B)/(N-NSG)):T=F
XT 1350 V1=NSG-1:V2=N-NSG:X=1/(V1/V2*F+1)
   :Y=1-X:PF=1:PT=1:VA=V1:VB=V2
DM 1360 IF V1/2<>INT(V1/2) AND V2/2=INT(V
   2/2) THEN 1390
HD 1365 IF V1/2<>INT(V1/2) AND V2/2<>INT(
   V2/2) THEN 1400
YM 1370 IF V2/2=INT(V2/2) AND V2>=V1 THEN
    1390
PX 1380 FOR Z=1 TO (V1/2-1):PF=PF*(0.5/Z*
   Y*VB):PT=PT+PF:VB=VB+2:NEXT Z:P=X^(V2*
   0.5)*PT:GOTO 1475
LS 1390 FOR Z=1 TO (V2/2-1):PF=PF*(0.5/Z*
   X*VA):PT=PT+PF:VA=VA+2:NEXT Z:P=1-Y^(V
   1*0.5)*PT:GOTO 1475
EP 1400 XT=ATN(SQR(F*V1/V2)):X=SIN(XT):Y=
   COS(XT):PT=Y:PF=Y
BM 1410 IF V2=1 THEN 1425
YC 1420 FOR Z=2 TO (V2-3) STEP 2:PF=PF*Y*
   Y*Z/(Z+1):PT=PT+PF:NEXT Z:PT=PT*X:XT=X
   T+PT
OD 1425 PT=1:PF=1
BD 1430 IF V1=1 THEN 1470
ZC 1440 FOR Z=2 TO (V2-1) STEP 2:PF=PF*Z/
   (Z-1):NEXT Z
QI 1450 PF=PF*Y^V2*X:PZ=1:PT=1:VB=V2+1:FO
   R Z=3 TO (V1-2) STEP 2:PZ=PZ*VB*X*X/Z:
   PT=PT+PZ:VB=VB+2:NEXT Z
VY 1460 XT=XT-PT*PF
TU 1470 P=1-XT*2/3.14159265
SO 1475 TS$="F-Value: ":GOSUB 1065:RETURN

NR 1550 GOSUB 710:GOSUB 9:POKE 559,0:FOR
   X=1 TO NSG:D=SUBJ(X)
WI 1570 IF D/2<>INT(D/2) THEN 1590
EJ 1580 NEXT X:GOTO 1595
IR 1590 GOSUB 1180:RETURN
NL 1595 GOSUB 10:FOR X=1 TO NSG:FOR Y=1 T
   O SUBJ(X)/2:TT=TT+SV(X,Y):TTS=TTS+(SV(
   X,Y)*SV(X,Y)):T(X)=T(X)+SV(X,Y)
IZ 1600 NEXT Y:T=T+T(X)*T(X):T(X)=0:NEXT
   X:FOR X=1 TO NSG:FOR Y=(SUBJ(X)/2)+1 T
   O SUBJ(X):TB=TB+SV(X,Y)
XG 1602 TBS=TBS+(SV(X,Y)*SV(X,Y)):T(X)=T(
   X)+SV(X,Y):NEXT Y:T=T+T(X)*T(X):NEXT X
   :FOR X=1 TO NSG:FOR Y=1 TO SUBJ(X)
TI 1605 A(X)=A(X)+SV(X,Y):B=B+SV(X,Y)*SV(
   X,Y):NEXT Y:A=A+(A(X)*A(X)):NEXT X
BS 1616 CMS=(A/SUBJ(1))-((TT+TB)*(TT+TB))
   /(NSG*SUBJ(1))
MN 1620 RWS=((TT*TT)+(TB*TB))/(((SUBJ(1))
   /2)*NSG)-((TT+TB)*(TT+TB))/((NSG*SUBJ(
   1)))
EE 1630 WC=B-(T/(SUBJ(1)/2)):IT=(B-((TT+T
   B)*(TT+TB)/(NSG*SUBJ(1))))-RWS-CMS-WC
WN 1640 C=(IT/(NSG-1))/(WC/(2*NSG*((SUBJ(
   1)/2)-1)))
GH 1660 A=RWS/(WC/(2*NSG*((SUBJ(1)/2)-1))
   ):B=(CMS/(NSG-1))/(WC/(2*NSG*((SUBJ(1)
   /2)-1))):DF=1:ST=A:GOSUB 1021
YV 1670 D=P:ST=B:DF=NSG-1:GOSUB 1021:E=P:
   ST=C:DF=2*NSG*((SUBJ(1)/2)-1):GOSUB 10
   21:G=P
YG 1680 OPEN #3,8,0,O$:GOSUB 250
KU 1690 POSITION 3,5:? #3;"F(rows):",,:?
   #3;A:POSITION 3,7:? #3;"P(r) Value:",:
   ? #3;D:POSITION 3,9:? #3;"F(cols):",,
FP 1700 ? #3;B:POSITION 3,11:? #3;"P(c) V
   alue:",:? #3;E:POSITION 3,13:? #3;"F(i
   nt):",,:? #3;C:POSITION 3,15
TT 1710 ? #3;"P(i) Value:",:? #3;G
IZ 1720 IF HC=0 THEN CLOSE #3:POSITION 7,
   21:? HC$:POKE 559,ANTIC:RL1=1730:RL2=8
   20:GOTO 210
BN 1725 RETURN
SK 1730 LPRINT :O$="P:":HC=1:GOTO 1680
LN 1800 GOSUB 710:GOSUB 9:POKE 559,0:GOSU
   B 10
RL 1805 Q=SUBJ(1):FOR X=1 TO NSG:FOR Y=1
   TO SUBJ(X):TB(X)=TB(X)+SV(X,Y):TT(Y)=T
   T(Y)+SV(X,Y):IF SV(X,Y)<=5 THEN TOT=1
XI 1811 IF SUBJ(X)<>Q THEN 1815
OD 1813 NEXT Y:T=T+TB(X):NEXT X
SP 1814 GOTO 1820
IT 1815 GOSUB 1180:RETURN
GA 1820 FOR X=1 TO NSG:FOR Y=1 TO SUBJ(X)
   :IF TOT=1 THEN C=C+((ABS(SV(X,Y)-(TB(X
   )*TT(Y)/T))-0.5))^2/(TB(X)*TT(Y)/T)
YI 1830 IF TOT=0 THEN C=C+((SV(X,Y)-(TB(X
   )*TT(Y))/T)^2)/(TB(X)*TT(Y)/T)
CI 1840 NEXT Y:NEXT X:DF=(SUBJ(1)-1)*(NSG
   -1)
LE 1860 IF C<31 OR DF>2 THEN A=DF/2-1:R=1
   :GOTO 1880
VX 1870 P=0:GOTO 2020
NX 1880 IF DF=2 THEN R=1:GOTO 1895
RL 1881 IF DF>1 THEN FOR B=1 TO (DF/2-0.5
   ):R=R*A:A=A-1:NEXT B
FA 1890 IF DF/2<>INT(DF/2) THEN R=R*1.772
   45374
HK 1895 D=1:F=1:G=((C/2)^(DF/2))*2/(EXP(C
   /2)*R*DF):X=DF+2
MY 1897 F=F*C/X:X=X+2:D=D+F
WP 2000 IF F>9.99999999E-31 THEN 1897
FM 2010 P=1-G*D:T=C
EF 2020 TS$="Chi-Square:":O$="S:":GOSUB 1
   065:RETURN
LA 2100 GOSUB 710:GOSUB 9:POKE 559,0:GOSU
   B 10
LK 2101 IF SUBJ(1)<>SUBJ(2) THEN GOSUB 11
   80:RETURN
TU 2105 FOR X=1 TO SUBJ(1):A=A+(SV(1,X)*S
   V(2,X)):B=B+(SV(1,X)*SV(1,X))
LL 2110 C=C+(SV(2,X)*SV(2,X)):D=D+SV(1,X)
   :E=E+SV(2,X):NEXT X:N=SUBJ(1)
GS 2120 F=((N*A)-(D*E))/SQR(((N*B)-(D*D))
   *((N*C)-(E*E))):R=F
HU 2130 TRAP 2145:SR2=R*R:DF=N-2:ST=SQR(S
   R2*DF/(1-SR2)):R=ATN(ST/SQR(DF)):RC=CO
   S(R):R2=RC*RC:RS=SIN(R):X=1
PL 2132 IF DF/2=INT(DF/2) THEN 2140
CR 2134 IF DF=1 THEN Y=R:GOTO 2142
SG 2136 Y=RC:FOR Z=3 TO (DF-2) STEP 2:X=X
   *R2*(Z-1)/Z:Y=Y+X*RC:NEXT Z
EB 2138 Y=R+RS*Y:GOTO 2142
SK 2140 Y=1:FOR Z=2 TO (DF-2) STEP 2:X=X*
   R2*(Z-1)/Z:Y=Y+X:NEXT Z:P=1-Y*RS:GOTO
   2150
QH 2142 P=1-Y*0.63661977:GOTO 2150
XR 2145 P=0
FQ 2150 T=F:TS$="Coefficient:":O$="S:":GO
   SUB 1065:RETURN
SM 2200 T$="     REGRESSION":GOSUB 710:GOS
   UB 9
HX 2201 GOSUB 250:A=0:POSITION 6,5:? "Cal
   culate which regression?":POSITION 9,7
   :? "A) Group 1 on Group 2"
AK 2202 POSITION 9,9:? "B) Group 2 on Gro
   up 1":POSITION 7,21:? A$:POKE 559,ANTI
   C:GET #2,Q:IF Q<65 OR Q>66 THEN 2202
MR 2203 IF Q=65 THEN Q=2:Z=1
NL 2204 IF Q=66 THEN Q=1:Z=2
JY 2210 POKE 559,0:IF SUBJ(1)<>SUBJ(2) TH
   EN GOSUB 1180:RETURN
JZ 2220 FOR X=1 TO SUBJ(1):A=A+SV(1,X)*SV
   (2,X):NEXT X:N=SUBJ(1):B=A-TOT(1)*TOT(
   2)/N
HW 2230 C=SSQ(Q)-(TOT(Q)^2)/N:D=B/C:E=(TO
   T(Z)-D*TOT(Q))/N
TF 2243 DF=N-2:SX=SSQ(Q)-(TOT(Q)*TOT(Q)/N
   ):SY=SSQ(Z)-TOT(Z)*TOT(Z)/N
RE 2244 TRAP 2255:SB=B/SX:S2=(SY-B*B/SX)/
   DF:ST=ABS(SB)/SQR(S2/SX):GOSUB 1021:GO
   TO 2260
HK 2255 P=0
XT 2260 OPEN #3,8,0,O$:GOSUB 250
UP 2270 IF Q=2 THEN POSITION 5,8:? #3;"Re
   gression of Gr. #1 on Gr. #2":T$="X'":
   TS$="(Y)":GOTO 2290
SM 2280 IF Q=1 THEN POSITION 5,8:? #3;"Re
   gression of Gr. #2 on Gr. #1":T$="Y'":
   TS$="(X)"
GR 2290 IF E>0 THEN POSITION 6,10:? #3;T$
   ;:? #3;" = ";:? #3;D;:POSITION 18,10:?
    #3;TS$;:? #3;" + ";:? #3;E
GC 2292 IF E>0 THEN POSITION 30,10:? #3;"
              ":GOTO 2305
EQ 2300 POSITION 6,10:? #3;T$;:? #3;" = "
   ;:? #3;D;:POSITION 18,10:? #3;TS$;:? #
   3;" - ";:? #3;ABS(E)
GV 2303 POSITION 30,10:? #3;"            "

LK 2305 IF P=0 THEN POSITION 6,12:? #3;"P
   -Value:",:? #3;"<.001":GOTO 2310
GZ 2306 POSITION 6,12:? #3;"P-Value:",:?
   #3;P
AO 2310 IF HC=0 THEN HC=1:POSITION 7,21:?
    HC$:POKE 559,ANTIC:RL1=2330:RL2=2320:
   GOTO 210
```

```
IH 2320 CLOSE #3:T$="      REGRESSION":RETU
   RN
ZR 2330 LPRINT :CLOSE #3:O$="P:":GOTO 226
   0
UK 2500 GRAPHICS 17:SETCOLOR 2,0,0:DL=PEE
   K(560)+PEEK(561)*256:POKE 559,0:POKE D
   L+13,2:POKE DL+21,2:POKE DL+23,2
SW 2510 POKE DL+15,2:POKE DL+19,2:POKE DL
   +28,65:POKE DL+29,PEEK(560):POKE DL+30
   ,PEEK(561):POSITION 6,5
KD 2520 ? #6;"StatWhiz":POSITION 6,8:? #6
   ;"Statistical Analysis Program":POSITI
   ON 15,11:? #6;"(Ver. 1.0)"
JO 2530 POSITION 19,19:? #6;"by":POSITION
    9,22:? #6;"Bernard I. Sparks, III"
VO 2540 POKE 559,ANTIC
TF 2550 FOR V=10 TO 0 STEP -4:FOR X=1 TO
   16:READ Z:SOUND 0,Z+30,10,V:SOUND 1,Z,
   10,V:FOR D=1 TO 6
QJ 2560 NEXT D:NEXT X:RESTORE 2570:NEXT V
   :SOUND 0,0,0,0:SOUND 1,0,0,0:RETURN
PI 2570 DATA 230,20,210,40,190,60,170,800
   ,150,100,130,120,110,140,90,160
ZU 2580 GRAPHICS 0:POKE 559,0:POKE 752,1:
   SETCOLOR 2,13,1:POSITION 15,0:? "MAIN
   MENU:":POSITION 9,3
SB 2590 ? "A> General Statistics":POSITIO
   N 9,5:? "B> T-test (Indpd)":POSITION 9
   ,7:? "C> T-test (Depnd)":POSITION 9,9
IV 2600 ? "D> One-way ANOVA":POSITION 9,1
   1:? "E> Two-way ANOVA":POSITION 9,13:?
    "F> Chi-Square":POSITION 9,15
NN 2610 ? "G> Pearson Correlation":POSITI
   ON 9,17:? "H> Regression":POSITION 8,2
   2:? A$:POKE 559,ANTIC:RETURN
HP 2620 POSITION 9,7:? "A> Create Databas
   e":POSITION 9,9:? "B> Modify Database"
   :POSITION 9,11:? "C> Load Database"
EO 2630 POSITION 9,13:? "D> Analyze Datab
   ase":POSITION 9,15:? "E> Return to Mai
   n Menu"
SQ 2640 POSITION 7,21:? A$:RETURN
JZ 2650 DIM D$(8):DIM SV(8,225):DIM SUBJ(
   225):DIM A$(28):DIM TS$(20):DIM T$(20)
   :OPEN #2,4,0,"K:":ANTIC=PEEK(559)
YQ 2660 A$="Press letter of selection":DI
   M SD$(28):SD$=" Save to disk?   (Y)es 
   (N)o ":DIM HC$(28):DIM O$(2):DIM N(8)
ST 2670 HC$=" Hard Copy?   (Y)es   (N)o ":D
   IM EA$(28):EA$=" End Analysis?   (Y)es
    (N)o ":DIM AO$(28):DIM SMP(2)
CF 2680 AO$=" All O.K.?   (Y)es   (N)o  ":D
   IM HV(8):DIM S(8):DIM SSQ(8):DIM LV(8)
   :DIM TOT(8):DIM M(8):DIM T(8)
ZC 2690 DIM SD(8):DIM VR(8):DIM TS(8):DIM
    B(8):DIM TT(8):DIM TTS(8):DIM TB(8):D
   IM TBS(8):DIM E(4,4):DIM A(8)
RD 2800 CH=0:U=0:V=0:GOSUB 2500:RETURN
```

PULL-DOWN MENUS

LEARN HOW TO PROGRAM THIS POPULAR SOFTWARE TECHNIQUE

Article on page 29

LISTING 1

Don't type the TYPO II Codes!

```
WY 10 REM PULLDOWN MENUS
LX 11 REM BY MARC ABRAMOWITZ
KU 12 REM (C)1990, ANTIC PUBLISHING INC.
PZ 20 REM Pulldown Menu Subroutine DEMO
DU 30 REM User to modify and use these su
   broutines in his/her own programs
KU 100 B=0:T=14:X=1:DIM A$(99),M$(99)
HC 110 GRAPHICS 0:POKE 709,T:POKE 710,B:P
   OKE 752,1:GOSUB 470
NS 120 M$="    DRAW      EDIT     LAYER  ":N=
   3:XM=5:GOSUB 180:REM GO TO MAIN MENU
YM 130 IF X=1 THEN M$="LINE      CIRCLE
   SQUARE             ":N=3:XM=5
TJ 140 IF X=2 THEN M$="ERASE      COPY
   MOVE               ":N=3:XM=14
RQ 150 IF X=3 THEN M$="MAKE       SET
   LTYPE     COLOR    ":N=4:XM=23
VF 160 GOSUB 300:REM GO TO SUB-MENU
KC 170 POSITION XM+1,12:? M$(A+1,A+6):REM
    PRINT CHOICE
SG 171 FOR LOO=1 TO 100:NEXT LOO
DH 172 IF STRIG(0)=0 OR PEEK(764)=12 THEN
    RUN
QA 173 GOTO 172
WX 175 REM * MAIN MENU (TOP) *
UI 180 POSITION 0,1:? "▯▯▯▯▯▯▯▯":IF FL THE
   N GOTO 240
RT 190 A=(X*9)-9:A$=M$:D=USR(INV,ADR(A$)+
   A,8):POSITION XM,0:? A$
ZN 200 IF FL AND FL2 THEN FL=0:FL2=0:RETU
   RN
OV 205 REM * MAKE A SELECTION *
QC 210 ST=STICK(0):TR=STRIG(0):K=PEEK(764
   )
KP 220 IF K=255 AND ST=15 AND TR=1 THEN 2
   10
WP 230 IF K=12 OR K=15 OR TR=0 THEN RETUR
   N
OJ 240 IF K=6 OR K=134 OR ST=11 THEN X=X-
   1
RI 250 IF K=7 OR K=135 OR ST=7 THEN X=X+1
AZ 260 IF X<1 THEN X=N
RS 270 IF X>N THEN X=1
XJ 280 POKE 764,255:GOTO 190
UK 290 REM * DRAW SUB-MENU *
MD 300 POSITION 0,1:? "▯";:POSITION XM,1:
   ? "▯▯▯▯▯▯▯▯"
DB 310 FOR I=1 TO N
WT 320 A=(I*9)-9:POSITION 0,1:? "▯";:POSI
   TION XM,1:? "▯";M$(A+1,A+6);"▯":NEXT I
GU 330 POSITION 0,1:? "▯";:POSITION XM,1:
   ? "▯▯▯▯▯▯▯▯"
CI 340 POKE 764,255:Y=1:GOTO 440
PE 345 REM * MAKE A SELECTION *
FI 350 ST=STICK(0):TR=STRIG(0):K=PEEK(764
   ):IF K=255 AND ST=15 AND TR=1 THEN 350
LZ 360 POKE 764,255:POSITION XM+1,Y+1:? M
   $(A+1,A+6)
IX 370 IF K=12 OR TR=0 THEN RETURN
CX 380 IF K=6 OR K=7 OR K=134 OR K=135 OR
    ST=7 OR ST=11 THEN FL=1:FL2=1:POP :GO
   TO 120
BQ 390 IF K=28 THEN FL=1:FL2=0:POP :GOTO
   120
DJ 400 IF K=14 OR K=142 OR ST=14 THEN Y=Y
   -1
AN 410 IF K=15 OR K=143 OR ST=13 THEN Y=Y
   +1
BS 420 IF Y<1 THEN Y=N
SL 430 IF Y>N THEN Y=1
QY 440 Y2=N-Y+1:A=(Y2*9)-9
XA 450 A$=M$:POSITION XM+1,Y+1:D=USR(INV,
   ADR(A$)+A,8):? A$(A+1,A+6):GOTO 350
XU 460 REM * ML INVERT ROUTINE *
QN 470 INV=ADR("hX▯h▯Lh▯Kh▯0h▯N ▯1Ki▯▯KHD
   NPU▯"):RETURN
```

LISTING 2

```
QD 10 REM PULL-DOWN MENUS, LISTING 2
LW 20 REM BY MARC ABRAMOWITZ
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "▯Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
```

```
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? "█COMPLETED█
   "
IM 1000 DATA 53
FB 1010 DATA 052055048032073078086061065Ø
   680820400341042160241041332041041332Ø3
   104133207104133206160000177
GG 1020 DATA 203105128145203200196206208Ø
   450960340410580820690840850820780321Ø5
```

Tech Tips

VERTICAL RAINBOW

By Virender Dayal

Unlike the usual horizontally scrolling rainbows that people are used to on the Atari, this program rotates vertical bands of shaded color on a GTIA Graphics 9 screen. Using the vertical blank interrupt (VBI), it changes the colors every 1/60 of a second. It also creates a window at the bottom of the screen, where you can enter color changes while the program runs.

Don't type the TYPO II Codes!

```
FK 10 GRAPHICS 0:POKE 623,64:SETCOLOR 4,1
   ,0:POKE 559,0:POKE 87,9:POKE 703,4:FOR
    T=39939 TO 39939+320 STEP 4
JI 15 POKE T,79:POKE T+1,128:POKE T+2,6:P
   OKE T+3,15:NEXT T:POKE 39936,112:POKE
   39937,112:POKE 39938,112:POKE T-1,143
GB 20 POKE 88,128:POKE 89,6:FOR X=0 TO 4:
   FOR U=0 TO 15:COLOR U:PLOT U+X*16,0:PL
   OT U+X*16,1:NEXT U:NEXT X
AK 25 POKE 560,0:POKE 561,156:POKE 660,0:
   POKE 661,159:POKE 87,0:POKE T,66:POKE
   T+1,0:POKE T+2,159:POKE T+3,2
OO 30 POKE T+4,2:POKE T+5,2:POKE T+6,65:P
   OKE T+7,PEEK(560):POKE T+8,PEEK(561):P
   OKE 559,34:POKE 54286,0
TL 35 FOR T=1536 TO 1595:READ A:POKE T,A:
   NEXT T:D=USR(1536):POKE 54286,192
ZC 40 DATA 104,169,49,141,0,2,169,6,141,1
   ,2,169,7,162,6,160,20,76,92,228,160,80
   ,185,127,6,72,24,105,1,41,15,133,205
MJ 50 DATA 104,41,240,105,16,5,205,153,12
   7,6,136,208,232,76,98,228,72,169,0,141
   ,10,212,141,27,208,104,64
```

NLQ ATARI XMM-801

By Barton Bresnik

The Atari XMM-801 is a fine printer for general purposes, but it lacks a near letter-quality (NLQ) print mode. However, it does offer bold printing and double-strike printing, both of which improve the print quality somewhat.

What the XMM-801 manual doesn't state, though, is that *both* double-strike and bold printing can be used at the same time, producing near letter-quality print. Doing so is quite easy, whether from BASIC or using a word processor—just send codes for [ESC], CHR$(69), [ESC] and CHR$(71).

For example, using either AtariWriter or AtariWriter Plus, you can turn on NLQ mode by typing:

[CONTROL][O]27E[CONTROL][O]27G

Hold down the [CONTROL] key as you type the capital letter O. To turn off NLQ, type:

[CONTROL][O]27F[CONTROL][O]27H

Note that after certain other printer control codes it may be necessary to reinitialize NLQ mode. The NLQ code may also be inserted with a custom printer driver (see your word processor manual).

But "there ain't no such thing as a free lunch." Printing NLQ takes longer, while ribbons and printhead receive four times the wear of draft mode printing, so reserve this NLQ technique for your final copy. (*We don't presently have an XMM-801 in the office to check this tip, but it looks right.* —ANTIC ED)

XMM-801 Draft Sample

```
     What the XMM 801 owner's manua
that both double strike and bold pri
same time, which produces near lette
quite easy, whether in BASIC or usir
codes for [ESC], CHR$(69), [ESC] and
```

XMM801 NLQ Sample

```
     What the XMM 801 owner's manua
that both double strike and bold pri
same time, which produces near lette
quite easy, whether in BASIC or usin
codes for [ESC], CHR$(69), [ESC] and
```

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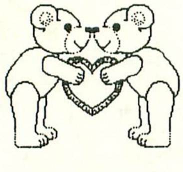
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